THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
June 25, 1990 · Vol. XXIV · No. 26 · 136 Pages · $2/Copy · $48/Year

COMPUTERWORLD

INSIDE

In Depth — Avoid the biggest EIS pitfalls. Page 87.

Executive Report — Making information accessible. Page 77.

Profile: It's full steam ahead for Carol Anderson after only six months as Trailer Train's new IS chief. Page 67.

Token-ring patent challengers have a good week as Soderblom suffers dual setbacks. Page 6.

Motorola dodges a bullet, but the fate of its 68030 chip is still in limbo. Page 6.

'We love standards,' says IBM, as it provides first evidence that it is serious about OSI. Page 12.

M&D users heartened but still skeptical about D&B's commitment to its acquired product line. Page 4.

A trimmer OS/2 displayed by IBM last week may point to rift with Microsoft. Page 121.

System managed storage users give mixed reviews. Page 27.

Apollo users breathe easier as workstation rollout indicates that HP hasn't forgotten them. Page 121.

Bush administration's hands-off policy toward high-tech comes under pressure from within. Page 93.

Repository too late for some users

BY ROSEMARY HAMILTON
CW STAFF

With IBM's long-awaited release of Repository Manager/MVS set to take place this week, several information systems shops will likely say "too late."

Some IS managers contacted last week said they are plowing ahead with their own repository-based development plans because they cannot wait for IBM. Their strategies call for using other vendors' products to bring some immediate improvements to application development, with a move someday to the IBM environment.

"I won't wait for IBM," said Giorgio Sorani, MIS director at Lubrizol Corp. in Wickliffe, Ohio, where Texas Instruments, Inc.'s repository-based Information Engineering Facility was recently installed. "We have two large development projects going on, and that was really the key" to selecting from available CASE options, he added. "We had to decide on conventional tools or take the [CASE] plunge. We couldn't wait."

IBM's Repository Manager is the key piece to AD/Cycle, its master plan for application development. According to IBM, Repository Manager will one day

Continued on page 8

Open systems revolt brews

IS heavy hitters form unified front to break down proprietary barriers

BY MITCH BETTS
CW STAFF

Like an underground political movement, a select group of information systems managers has been holding private meetings to plot the gradual overthrow of proprietary systems in favor of "open computing systems."

The fledgling coalition, known as the "Houston 30" because there were 30 managers at a recent meeting in Houston, is dedicated to breaking down the barriers to open systems, according to Bud Huber, the group's spokesman and manager of advanced networks integration at Hughes Aircraft Co. in Long Beach, Calif.

Meeting of the minds

The delegates at the meeting late last month represented 25 North American corporations and government agencies, including such heavyweights as General Electric Co., General Motors Corp., Du Pont Co., McDonnell Douglas Corp., Eastman Kodak Co. and NASA (see chart page 4).

The participants included a mixture of chief information officers and midlevel IS managers in charge of systems integration, according to Charles J. Gardner, director of information technology infrastructure at Kodak in Rochester, N.Y.

One observer, Roger Martin of the National Institute of Standards and Technology, said the fact that users are banding together represents "a fundamental shift in the way users are approaching the computer industry."

Like the anchorman in the

Continued on page 4

Hacker raids stir up battle over constitutional rights

BY MICHAEL ALEXANDER
CW STAFF

Federal and state law enforcers have been busily executing search warrants on the homes of computer hackers suspected of high-tech crimes while at the same time raising troubling questions of constitutional rights in an electronic age.

The nationwide dragnet now under way is urgently needed to stem the alarming rise in hacker attacks on individual privacy, business and national security, said William Cook, the Chicago-based assistant U.S. attorney who has spearheaded the Justice Department's efforts.

However, civil libertarians asserted last week that authorities have crossed the bounds of the Constitution in carrying out searches, which have often led to the seizure of computer equipment used for bulletin-board systems.

Mitch Kapor, founder of Lotus Development Corp. and On Technology, Inc., and John Barlow, an author and lyricist for the Grateful Dead, will announce the official launch of a computer hacker defense team "within a few weeks," as a result of the government's crackdown on computer crime, Kapor said last week.

Two law firms, Rabinowitz Boudin Standard Krinsky & Lieberman in New York and Silverglate Gertner Fine & Good in Boston, are the other members

Continued on page 6

Tom Monahan

Peace has a price for defense firms' IS

BY RICHARD PASTORE
CW STAFF

Soviet President Mikhail Gorbachev's *glasnost* road show may have wowed them in Foggy Bottom, the Twin Cities and the Silicon Valley earlier this month, but few people were applauding in the IS departments of U.S. defense contractors.

The information systems groups at several weapons makers and subcontractors are feeling, or at least anticipating, a chill from post-Cold War defense spending cuts. Potentially, the "peace dividend" could be costly for many of the several thousand IS staffers in the defense industry, observers said.

"We're seeing a lot of [contractors] running very scared," said Frank Solner, president of Solner Systems, Inc., an Orange, Calif.-based systems consultant to aerospace and defense firms. "They're doing nothing from an MIS standpoint. They're not spending any money on computers, period."

For example, McDonnell Douglas Corp., the nation's largest defense contractor, has hit the brakes on IS spending and trimmed its staff by 10%.

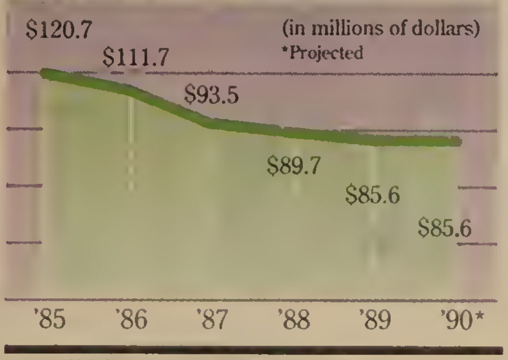
McDonnell's IS group may also face further pressure. Last week, in a memo to employees, Chairman of the Board John McDonnell said the firm will seek to save $700 million this year through "substantial layoffs across the corporation."

McDonnell Douglas has spent more than a year re-examining the automation of its manufacturing processes as well as the

Continued on page 118

Slippery slope

Defense procurements, measured in constant 1990 dollars, are steadily declining



Source: U.S. Department of Defense CW Chart: Doreen Dahle

Spared

Defense spending cuts shouldn't hurt computer firms and may actually lead to new business. Page 119.

NEWSPAPER

IN THIS ISSUE

NEWS

4 McCormack & Dodge users hear a lot of support talk but remain on the skeptical side.

6 Motorola teeters on its patent infringement tightrope, but chip production goes on.

6 Token-ring and FDDI royalties could lighten in wake of patent re-examination.

10 High-tech export constraints lose another layer of red tape.

12 IBM shores up its standards support with a flotilla of TCP/IP and OSI products.

14 In a mirror dimly: Peering into the future brings a clear imaging and optical allusion.

118 Laid-off Unisys workers fight for a say in the future.

119 Defense contractors' budget keelhaul may not mean high-tech industries' financial downfall.

120 Appletalks to others now, as its maker opens up its networking architecture.

121 IBM and Microsoft deliver conflicting views on the release of a sleeker OS/2.

Quotable

"You can't sit back and say, 'I made the right decision,' but you can say, 'I made the best decision for my organization at this moment.' "

BOB WALL
RITE-AID CORP.

On whether IS shops should go with IBM's Repository Manager. See story page 1.

SYSTEMS & SOFTWARE

27 From the traditional East Coast to the PC-crazy West, a DECUS survey fills in user outlines.

PCs & WORKSTATIONS

39 Pulling a rabbit out of a workstation: Some of Hollywood's latest special effects come from computer animation.

NETWORKING

57 Rutgers University favors a light touch with its Ethernet LANs: It's using lasers to string them together.

MANAGER'S JOURNAL

67 Trailer Train's Carol Anderson makes tracks with large development projects.

COMPUTER INDUSTRY

93 A Commerce Department report warns that Japan is roaring down the backstretch in its race to best the U.S. electronics industry.

EXECUTIVE REPORT

77 Information reconciliation ranks high on the list of IS priorities.

IN DEPTH

87 Here's how to sidestep the errors that can ambush an EIS implementation. By Hugh Watson.

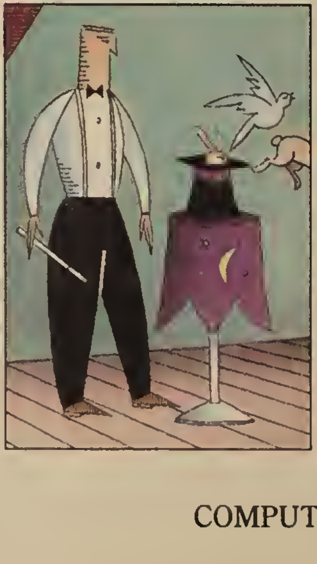
DEPARTMENTS

8, 118 News Shorts
20 Advanced Technology
24 Editorial
72 Calendar
99 Computer Careers
110 Marketplace
115 Training
117 Stocks
122 Trends

Catalyst change. From *Global Corporate Intelligence* by George Roukis et al.: "The [technological] revolution is producing corporate structural change, with large companies seeking to expand their global influence and merging with other very large corporations. Simultaneously, the technology has created innumerable applications opportunities and has brought into existence an industry of entrepreneurs to service niche markets between the components of the new technology and potential users. The technical service capability has been identified as the real source of future economic power."

Joyce Ravid

June Marrero Drewry, Charles McCaig and Keith Glover cleared an information block at Mutual Benefit Life. Page 77.



Has IBM's system managed storage concept lived up to its promise? Page 27.

EXECUTIVE BRIEFING

■ **IS executives are feeling pressure** from business managers clamoring for fast, easy access to information from both inside and outside their companies. Determining exactly what data users require and how best to deliver it isn't always easy, however, because requests are often based on mistaken assumptions about what is possible. Some firms are trying to build improved communications channels. Mutual Benefit Life, for example, has set up a program in which line managers and IS professionals swap roles for a year. It has also created a new hybrid position spanning both line and IS functions. **Page 77.**

■ **Riding on the peace train** might be a costly journey for the IS organizations of the nation's defense contractors. Cuts in defense spending are already affecting aircraft maker McDonnell Douglas, where IS spending has been halted and the IS staff is being trimmed. **Page 1.**

■ **It is wishful thinking** to believe that there is a correlation between the amount of money spent on information technology and the payback, according to Michael Scott Morton at MIT. One reason is that investments in technology often benefit the customer, not the firm. **Page 67.**

■ **Graphical user interfaces may not be much better** than their character-based counterparts. These are the findings of a Microsoft- and Zenith Data Systems-sponsored study that was designed to quantify the intuitive evidence that graphical user interfaces are better than character-based systems. **Page 39.**

■ **With storage demand reaching crisis levels** at some companies, managing the process well has become critical. IBM's system managed storage approach, which automates storage management, is getting good reviews from some in the user community, but skepticism from others who say it is not as feature-rich and trouble-free as they had hoped it would be. **Page 8.**

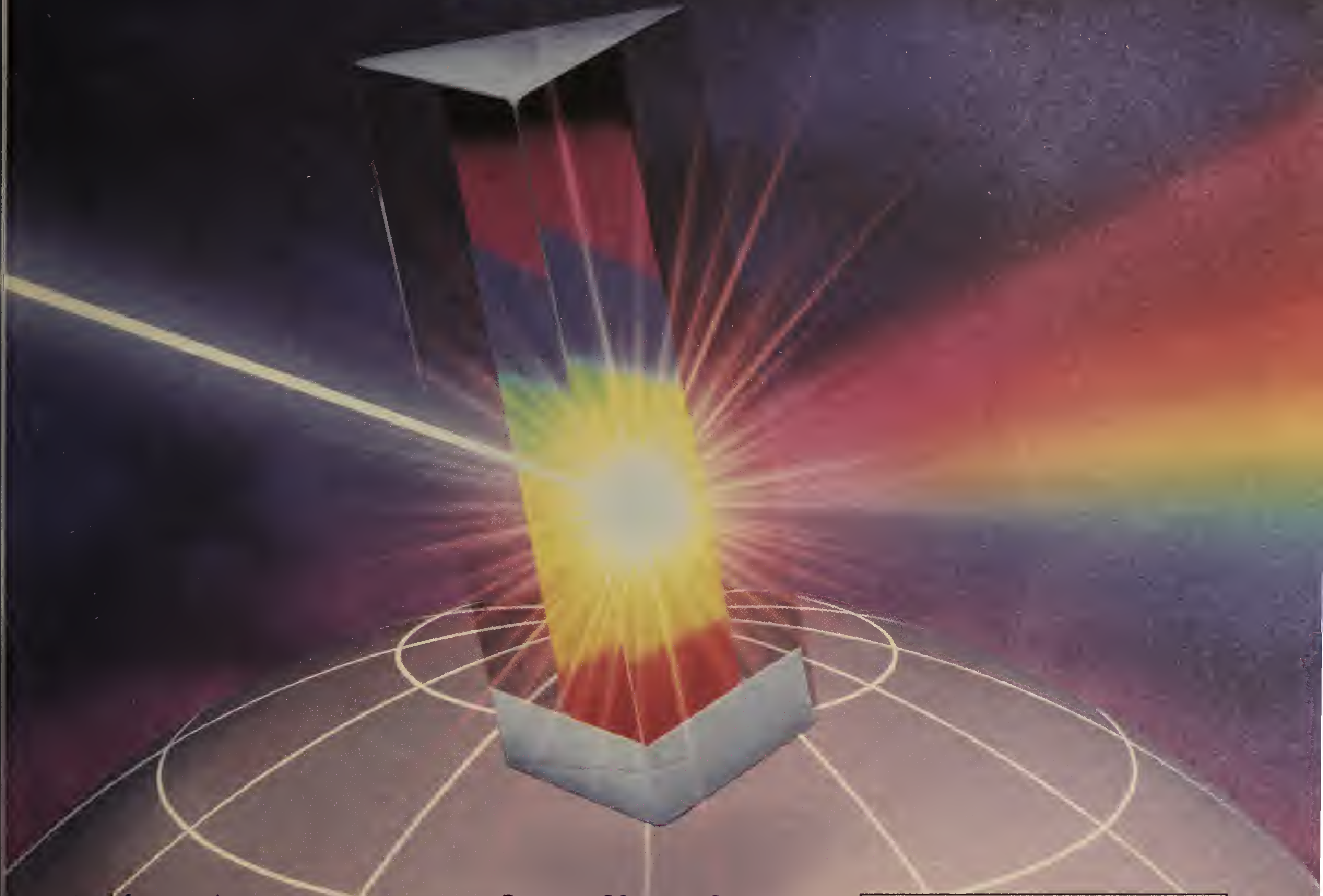
■ **Tear down the wall!** Thirty IS managers from major companies are banding together in an effort to tear down the barriers that proprietary systems have placed on how the managers do their computing. **Page 1.**

■ **If you're not doing it now,** you should be looking into electronic data interchange and very small-aperture terminal satellite networks for substantial competitive advantages, say IS executives. **Page 64.** Another up-and-coming technology for the '90s is image processing, and the time to start exploring it is now, according to speakers at last week's Image Tech conference. **Page 14.**

■ **Carol J. Anderson is on the fast track** at Trailer Train Co. in Chicago. During her six months as vice-president of MIS, she has installed an IBM AS/400, overseen a DB2 evaluation and made a commitment to CASE technology. **Page 67.**

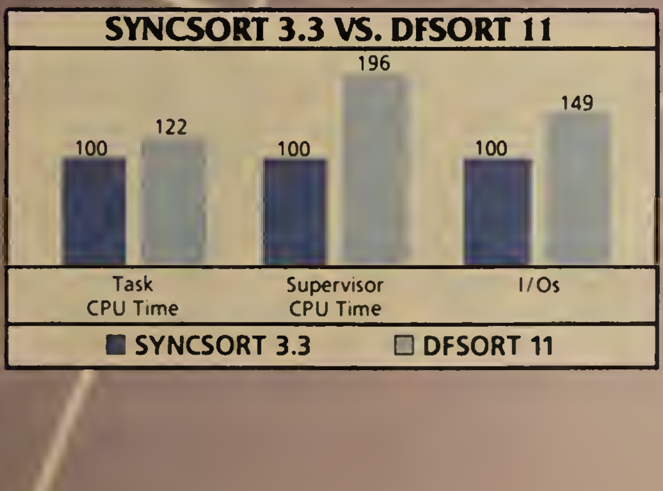
■ **On-site this week:** A few years back, Georgia-Pacific was forced to make mainframe purchases every couple of years. Today, the firm is a model of how to downsize and has come up with some creative uses for its midrange computers along the way. **Page 29.** Rutgers University adopts a space-age approach to temporarily interconnect its Ethernet local-area networks by beaming the data between the LANs with lasers. **Page 57.** Industrial Light and Magic, a cinematic special-effects firm, relies on surprisingly simple workstation technology to create what have been several Oscar-winning special effects. Its contributions to such films as *Who Framed Roger Rabbit* and *Star Wars* were done on Silicon Graphics and Sun Microsystems workstations that are linked by Ethernet cable and running homegrown and off-the-shelf applications. **Page 39.**

SYNCSORT. WHERE BUSINESS TURNS FIRST FOR SORTING EFFICIENCY.



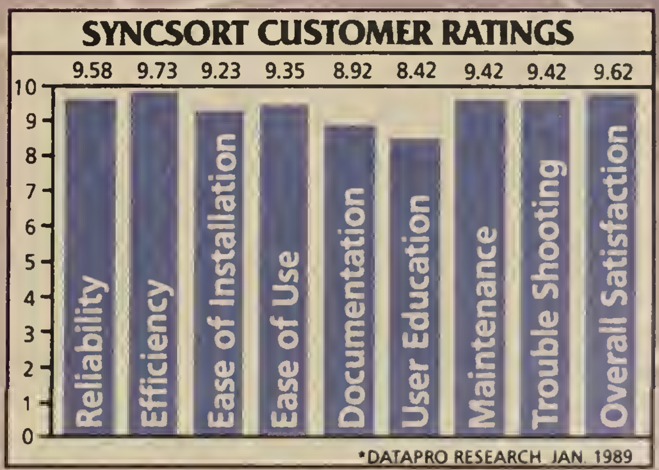
And for good reason.

Thousands of companies — including American Express, The Dow Chemical Company, AT&T and 97 of the Fortune 100 companies — have saved tremendous amounts of time and money by sorting with Syncsort.



For over 20 years, Syncsort has been the Number One sorting company, consistently outperforming all competition. Year after year, customers have given Syncsort the highest marks for reliability, efficiency, ease of installation, ease of use, technical support, and user education. Working in partnership with businesses of all sizes, Syncsort helps them get the fastest, most efficient sorts.

For increased productivity and greater savings, choose the sorting solution that the Fortune 100 turn to first...Syncsort.



syncsort INC.

50 Tice Boulevard, Woodcliff Lake, NJ 07675

800-535-3355

Open systems

FROM PAGE 1

movie *Network*, users are "mad as hell and won't take it anymore. They have matured to the point and have had their problems grow to the point that they have to take an active approach," said Martin, manager of the software engineering group at NIST in Gaithersburg, Md.

The Houston 30 has already decided to begin talks about a possible affiliation with the Corporation for Open Systems. In addition, it has drafted a paper identifying the internal and external barriers to open systems.

However, the group's primary goal is to "identify user requirements that are common across a multitude of industries, so they can be fed into the standards process and into the vendor community," Huber said.

For example, the group might take a general business requirement — such as the need for file transfers between all applications — and then work with vendors to agree on technical interface standards that would make it happen. The user group could eventually throw its weight behind a suite of standards, such as a single version of the Unix operating system, the IEEE Posix standard for software portability and a single version of SQL.

The group's organizers, however, said that deciding on those technical standards may be a five-year process, and they acknowledged that success will require users to show some solidarity. "Before we can go to vendors, we have work to do inhouse," said Jere Thomas, a Houston-based consultant who helped form the user group. Vendors have often complained that while many users say they support open systems, they still buy proprietary ones.

General consensus

IS managers need to get all of the business departments in their organizations to agree to the open systems goal, even if it costs a little more in the short term, Thomas said. "Then we can tell IBM and Digital Equipment Corp. that if you do this, we're ready to buy it," he said.

Thomas stressed that users want to have a cooperative, rather than confrontational, relationship with vendors. "You can overdo the user approach. We need a partnership with vendors, because the user is not going to build this stuff," he said.

Huber said the IS managers are hoping to use their collective clout to accelerate the availability and use of open systems, defined as information systems based on international and de facto standards rather than on proprietary systems.

"We don't want to be a standards body. We want to document, in succinct statements, the common user requirements so the standards bodies and vendors can respond," he added.

In a statement released to the press last week, the Houston 30 said that users "want vendors to know of the serious nature of these discussions and the need to make substantial progress toward open systems."

On the topic of operating systems, Huber said that the Houston and Atlanta meetings included criticism of the impasse between Unix International and Open Software Foundation, which are promoting different versions of Unix.

The Houston 30 press release indicated that users want a single, open version of Unix. "The impasse is a classic example of vendors making their [interests] paramount, to the detriment of their customer base," the statement read.

A paper that lists barriers to open systems is due to be publicly released by late August, and the next meeting of the group will be held in the Detroit area in mid-September. The meetings are strictly limited to "open systems champions" from user organizations.

Huber said that IS managers interested in participating in the September meeting should call Industry Cooperative Services, Inc. in Ann Arbor, Mich., at (313) 769-4454.

United they stand

The "Houston 30" includes representatives from the following organizations:

Conoco, Inc.
Deere & Co.
Du Pont Co.
Eastman Kodak Co.
Exxon Chemical Co.
Ford Motor Co.
General Electric Co.
General Motors Corp.
Gulf Canada Resources Ltd.
Hughes Aircraft Co.
McDonnell Douglas Corp.
Merck & Co.
NASA
Raytheon Co.
Texaco Refining & Marketing, Inc.
U.S. Air Force

M&D users still fuzzy on D&B support plans

BY MAURA J. HARRINGTON
CW STAFF

SAN FRANCISCO — Nervous McCormack & Dodge users gathered last week in hopes of learning Dun & Bradstreet Software's product and support strategy as the company continues the merger process. However, many left the conference skeptical and confused about how the company will "bridge" the redundant applications software lines it has acquired.

Speaking to users, D&B Software Services Chairman and Chief Executive Officer John Imlay repeatedly promised to support both M&D's M-Series and Management Science America's E-Series product lines for "as long as there is a demand."

Though users barely batted their eyes, seemingly unimpressed with Imlay's introduction of four service features slated to be out by the end of July, the CEO said the services will improve product support and alleviate users' anxiety about the quality and availability of support.

The announced features included the following: An on-line bulletin board service called Insight; a 24-hour phone support service for emergencies that stop production; one support number for all the product services for M&D users; and a program that will prioritize users' help requests based on the severity of their problems, said Julie Donahue, vice-president of worldwide support at D&B's Framingham, Mass., Huntsville, Ore., and Atlanta facilities.

> "CUTTING COSTS is getting a lot of attention here, so it is very important for us to know what is down the line with the M&D product line."
>
> MICHAEL WHYLINGS
> CAMPBELL SOUP

"Usually, there are strict rules as to what is deemed a severe problem and what is not. With this program, we will let the user determine the severity level of his or her situation," Donahue said.

However, users said that because support has dropped off a bit since the merger took place, they are going to take a wait-and-see attitude about these new features before judging their relevance. One user, who works at Visa Corp. in San Francisco, said that while Imlay sounded convincing, the user was pessimistic as to whether the M-Series product line would be supported at the same high quality rate as before the merger.

Other users said that if Next-Gen, the future D&B Software line that will merge both the MSA and M&D software products, is not a "merger of the best of both products" as promised, they will be forced to look at other software options.

Imlay said the firm is still not ready to talk about specifics of the Next-Gen product line, although he outlined broad specifications that he said the product will meet.

For example, software will first be compliant with X/Open Consortium Ltd.'s X/Open standard, which is compliant with Open Systems Foundation and Unix International, Imlay said. The software will also be compliant with IBM's Systems Application Architecture strategy, he added.

In terms of support, Imlay said, "It is a profitable venture for us to continue to support both product lines." D&B Software nets about $60 million per year on maintenance services.

The development cost for the Next-Gen product line is estimated at more than $100 million, Imlay said.

He added that the old product lines would continue on their upgrade paths as previously planned, while a separate team worked on the Next-Gen project. Because the Next-Gen product line has not been worked out in detail, Imlay said users have no choice but to take a wait-and-see attitude.

Michael Whylings, manager of the financial information systems department at Campbell Soup Co. in Camden, N.J., said he is willing to wait, but cost-justification of Next-Gen is a high priority for Campbell, which is decentralizing its IS department. "It looks as though nothing will happen for at least three to five years . . . but with the reorganization, cutting costs is getting a lot of attention here, so it is very important for us to know what is down the line with the M&D product line."

Anne Alfieri, manager of the systems development audit department at Scott Paper Co. in Philadelphia, agreed that migrating to the Next-Gen product line might not be cost-justifiable if it turns out to be like a new implementation of the software because of the time and resources needed for such a vast project.

COMPUTERWORLD

Editor in Chief
Bill Laberis
Executive Editor
Paul Gillin

News Editor
Peter Bartolik
Assistant News Editor
James Connolly
Senior Editors
Clinton Wilder, Management
Elisabeth Horwitt, Networking
Patricia Keefe, PCs & Workstations
Michael Alexander, Advanced Technology
Rosemary Hamilton, Systems & Software
Nell Margolis, Industry
Senior Writers
Alan J. Ryan
Maryfran Johnson
Joanie M. Wexler
Staff Writers
Richard Pastore
Sally Cusack
Maura J. Harrington
New Products Writer
Gary Byrne

Features Editors
Glenn Rifkin
Joanne Kelleher
Senior Editors
Michael L. Sullivan-Trainor
Amiel Kornel
Joseph Maglitta,
In Depth/Integration Strategies
Mary Grover, Product Spotlight
Managing Editor, Special Projects
Lory Zottola
Senior Writer
David A. Ludlum
Associate Editor
Laura O'Connell
Researchers
Jodie Naze
Kim Nash
Interns
Kelly E. Dwyer
Derek Slater

Chief Copy Editor
Donald St. John
Assistant Chief Copy Editor
Joyce Chutchian
Features Copy Editors
Cathleen A. Duffy
Carol Hildebrand
Copy Editors
Catherine Gagnon
Christopher Lindquist
Kimberlee A. Smith
Toby Dorsey

Design Director
Nancy Kowal
Graphics Designer
Tom Monahan
Graphics Specialist
Paul Mock
Design Assistant
Marie J. Haines
Graphics Researcher
Kevin Burden

Assistant to the Editor in Chief
Linda Gorgone
Editorial Assistants
Lorraine Witzell
Tammy Gryniewicz
Stefanie McCann
Rights and Permissions Manager
Sharon Bryant
Back Issues
Margaret McIndoe

News Bureaus
Mid-Atlantic
201/967-1350
Johanna Ambrosio, Senior Correspondent
Washington, D.C.
Mitch Betts, National Correspondent
202/347-6718
Gary H. Anthes, Correspondent
202/347-0134
West Coast
415/347-0555
Jean Bozman, Senior West Coast Editor
J.A. Savage, Senior Correspondent
Charles von Simson, Senior Correspondent
James Daly, Senior Correspondent
Jim Nash, Correspondent
Chris Flanagan, Editorial Assistant
Midwest
708/827-4433
Ellis Booker, Correspondent
Michael Fitzgerald, Correspondent

IDG News Service
Penny Winn, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
508/879-0700
Fax: 508/875-8931
MCI Mail: COMPUTERWORLD
Subscriptions: 800/669-1002

New Twist On An Old Problem

Oracle's protocol-transparent network products unify incompatible networks.

If you like industry standards you'll love networking. Because there are so many network standards: Ethernet, Token Ring, Named Pipes, DECnet, LU6.2, FDDI, TCP/IP, SPX/IPX, X.25, SNA, etc.

Oracle's software lets you integrate all the networks you have today and adopt new technologies as they emerge.

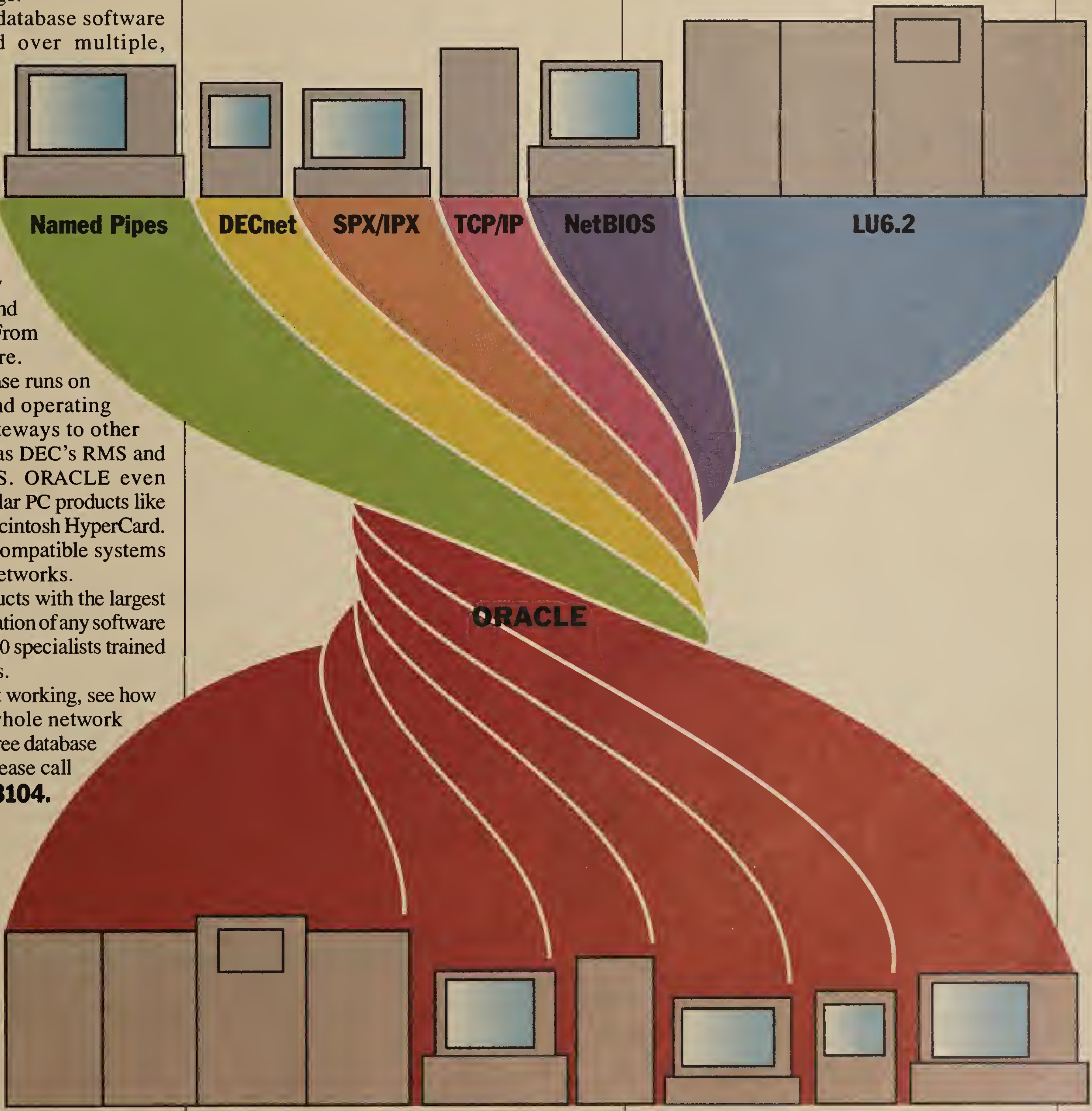
Oracle's network and database software makes data distributed over multiple, incompatible networks and computers appear as if it were a single database on a single computer. So users can get the information they need without having to know where it comes from.

This is because ORACLE works with virtually every network protocol, media and network operating system. From LU6.2 to DECnet to NetWare.

And the ORACLE database runs on every major computer and operating system. It also offers gateways to other major data sources such as DEC's RMS and IBM's DB2 and SQL/DS. ORACLE even supports access from popular PC products like Lotus 1-2-3, dBASE, and Macintosh HyperCard. So companies can turn incompatible systems into a unified network of networks.

Oracle backs all its products with the largest service and support organization of any software company, including over 200 specialists trained to handle networking issues.

If your networking is not working, see how one twist can turn your whole network around. To sign up for our free database conference in your area, please call **1-800-633-1071 ext. 8104.**



ORACLE®

Compatibility • Portability • Connectability

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

Motorola granted reprieve

Eleventh-hour ruling puts 68030 chip back in production — for now

BY JAMES DALY
CW STAFF

Once again, Motorola, Inc. has escaped the hangman's noose.

Only hours after a federal judge reinstated an order that ground the production and shipment of its flagship 68030 microprocessor to a halt last week, a higher court overturned the decision, and Motorola's assembly line was again back in business — although the long-term fate of the chip and the popular systems based on it remain uncertain.

Motorola was banned from selling the 68030 on March 29 when U.S. District Judge Lucius D. Bunton in Austin, Texas, ruled that the chip infringed on a patent held by Japan's Hitachi Ltd. Hitachi's H8 chip was also found to infringe on a Motorola patent and was barred from sale in the U.S.

Bunton granted a stay of the order until June 18 to give both companies time to settle their differences out of court, but the stay expired last Monday without a settlement.

Only hours after the ban was reinstated, however, Judge Howard T. Markey of the U.S. Court of Appeals for the Federal Circuit Court in Washington, D.C., granted another temporary stay. Schaumburg, Ill.-based Motorola had until Friday to file a formal appeal. The judge could act on that motion as early as today.

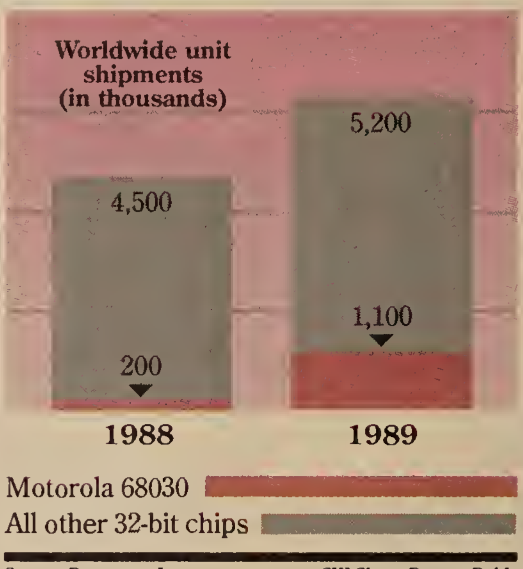
Experts said that the case could have devastating consequences if it is not settled quickly. The 68030 forms the heart of Apple Computer, Inc.'s popular Macintosh line and is also used by dozens of other companies, including Hewlett-Packard Co., Sun Microsystems, Inc. and Next, Inc. The H8, on the other hand, accounts for only 1% of Hitachi's annual $3 billion semiconductor business and is not leading-edge technology, Hitachi spokesman Osamu Naito said.

Hitachi has sought an immediate suspension of sales of the 68030, although companies would be able to continue selling finished goods using the chip. A Hitachi spokesman said he did not know what the impact would be on chips held by distributors.

The impact could also go beyond the 68030. Motorola's next-generation 68040 chip incorporates some of the same design characteristics that are central to the 68030 dispute, according to Motorola spokesman Tim Kellogg.

'30something

The Motorola-Hitachi dispute comes at a time when the 68030 is grabbing a hefty share of the workstation market



Source: Dataquest, Inc. CW Chart: Doreen Dahle

Although Apple spokesman Yolanda Davis claimed the Cupertino, Calif., firm had "appropriate inventory for the present market," Apple has reportedly filed confidential documents with the court claiming it kept only an eight-day supply of the chips. This is in keeping with many companies' just-in-time inventory policies in which production and component ordering cycles are closely aligned to reduce waste.

An HP spokesman said the Palo Alto, Calif., company would not be affected by the ruling because HP signed a technology sharing agreement in 1985 with Hitachi that would allow Motorola to continue making the microprocessor for HP.

Many within the industry expressed dismay at the inability of the firms to come to a settlement. "For the life of me, I cannot figure out why it is taking them so long to work this out," said Jack Quinn, a senior analyst at Instat, Inc., located in Scottsdale, Ariz.

Users — especially those in the midst of hardware purchasing decisons — have also become frustrated. Bill Porter, MIS manager at the All American Home Center in Downey, Calif., is installing a point-of-sale system but has held back in making final system purchasing decisions until the fate of the chip is certain. "We're not sure we want to build our system based on a technology whose future is uncertain," he said.

A university personal computer manager and Apple user who was interviewed at PC Expo in New York two weeks ago said, "[Motorola and Hitachi] better get their acts together, or I'll start looking more seriously at IBM."

Both companies, however, said they are deep into negotiations to settle the dispute.

Motorola officials also said that they will ask in their appeal that the court consider reopening the case, because Motorola has found new evidence that could damage Hitachi's original patent. Motorola's patent attorneys said they have uncovered a 1966 patent that could potentially invalidate the Hitachi patent Motorola is alleged to have infringed on.

Rights

FROM PAGE 1

of the planned hacker defense team.

While malicious hacking poses a threat to individuals and organizations alike, civil libertarians have charged that the U.S. government has swept up innocent people in its net. Government agents have intimidated some hackers who sought legal counsel and stampeded over their constitutional rights to free speech by illegally seizing computers used to operate bulletin-board systems, said Terry Gross, an attorney at Rabinowitz Boudin Standard Krinsky & Lieberman. The firm is noted for its expertise in handling cases that it believes are deliberate attacks on constitutional rights. For example, it defended Daniel Ellsberg in the celebrated Pentagon Papers case.

Computerworld learned last week that Rabinowitz Boudin Standard Krinsky & Lieberman is already providing legal assistance in the defense of Craig Neidorf, a 20-year-old hacker and newsletter editor who has been indicted in Chicago in a scheme to steal Bellsouth Corp. documentation for an enhanced 911 emergency telephone system.

"I personally asked the attorneys to provide some informal advice in these matters, and that is obviously a logical precursor to more formal involvement," Kapor said in an interview.

The defense team is in the midst of setting up a formal structure and strategy for the organization, Kapor said. Asked if the group will provide funds to pay legal fees for computer hackers, Kapor replied: "I contemplate doing that very strongly, but none of these decisions are final or public."

Kapor said that he and Barlow decided to contact the two law firms to propose setting up a defense team after U.S. Secret Service agents swooped down on the homes of 28 hackers in 14 cities last month. The agents seized computers, floppy disks, telephone maintenance equipment and computer printouts. The raids were executed as part of a two-year investigation code-named Operation Sundevil.

On Technology's Kapor *to launch hacker defense team*

"The government is overreacting," said Sheldon Zenner, Neidorf's attorney and a member of the Katten Muchin & Zavis law firm in Chicago. "They are grappling with legitimate concerns of computer crime but are trampling constitutional rights at the same time."

Zenner said that he will file First Amendment motions this week on his client's behalf. Neidorf was slated to go to trial in federal district court in Chicago last week, but the trial was rescheduled for next month to allow the defense to file new motions.

"Craig is a 20-year-old nebbish, so they don't mind going after him," Zenner said. "They didn't think that it would raise the same issues as if they went after *The New York Times* or *The Wall Street Journal.*"

Neidorf, who recently completed his junior year at the University of Missouri, is a co-editor of "Phrack," a newsletter for computer hackers. He has admitted to publishing an edited version of 911 documentation but contended that he did not know the information had been stolen.

Federal and state law enforcers have maintained that it is necessary to seize a computer to evaluate its contents for evidence of a crime, not to block publication of any information on a bulletin board.

"I don't see this as a First Amendment issue," said Kirk Tabbey, a Michigan assistant prosecuting attorney and coordinating legal counsel to the Michigan Computer Crime Task Force.

"It is an intrusion only as far as we need to prove the crime," Tabbey said. "You try to take only what you need because you have to comply with the Fourth Amendment, which limits illegal searches and seizures."

Steve Jackson, founder of Steve Jackson Games in Austin, Texas, said he thinks otherwise. In March, the Secret Service raided his office and the home of an employee and seized computers that it said contained a "handbook on computer crime," Jackson said. The handbook was in fact a game, he said.

Token-ring patent suspended

BY JOANIE M. WEXLER
CW STAFF

Two actions last week could loosen the royalty-payment shackles imposed by patent holder Olof Soderblom on token-ring and Fiber Distributed Data Interface vendors and lead to lower prices for the costly, emerging FDDI local-area network.

FDDI, a high-speed LAN, is based on token-ring technology. Soderblom, who has been collecting royalties of about 3% on copper-based token-ring products from IBM, Hewlett-Packard Co., 3Com Corp. and many other vendors for years, earns royalties on FDDI products of as much as $275 per adapter card.

The U.S. Patent Office, which has been conducting a re-examination of Soderblom's patent, has issued an initial response to invalidate and suspend the patent, originally issued in the U.S. in 1968 but reissued in 1984 with broader claims.

According to Wellington Chin, a patent examiner working on the Soderblom case, the rejection is not a final decision. Soderblom can now file a formal response to which the patent office must respond.

In addition, UK-based Madge Networks, Inc., a token-ring vendor that has been involved in litigation with Soderblom over the past two years for refusing to pay royalty fees, won the case last week "on all counts," according to Ed Murray, Madge's director of North American operations. Soderblom's European token-ring patent expired in 1985, but he sued Madge for back royalty payments. Litigation between the two parties is still pending in San Francisco.

According to Madge, a judge in England's High Court of the Royal Courts of Justice found that the Soderblom invention differed from today's peer-to-peer token-ring configuration in that it was based on a master/slave principle. The U.S. and UK claims, according to Murray, are essentially the same.

However, Soderblom's lawyer, George Vande Sande, said the UK decision is "no threat to the U.S. patent, because the claims and history of the two are altogether different. The British attorneys will certainly appeal."

Introducing the best thing to happen to systems and network management since NET/MASTER.™

NET/MASTER from Systems Center.

Ever since its introduction, NET/MASTER has earned high praise for its unique combination of integrated network management, automated operations, network control language, and outstanding ease of use.

Now NET/MASTER has even more to offer: the worldwide resources of Systems Center—a proven leader in systems and network software, and a responsive vendor with a history of innovation and commitment to customer partnership.

NET/MASTER is already making great things happen at nearly 2000 installations. To see what it can do for you, contact Systems Center, Inc., 1800 Alexander Bell Drive, Reston, Virginia 22091, (703) 264-8000.
A New York Stock Exchange company.

SYSTEMS CENTER

Copyright 1990 Systems Center, Inc.
NET/MASTER is a trademark proposed to be transferred to Software Developments International Pty Limited or Systems Center, Inc.

W-CWX-900625

NEWS SHORTS

IBM provides technology peek

A small group of press and analysts were treated to demonstrations of upcoming technology from IBM at PC Expo last week. Besides showing a 2M-byte version of the 16-bit OS/2 (see story page 121), IBM demonstrated what it claimed was the first instance of full-motion video going out over a network. It also showed an Intel Corp. 33MHz I486-based "super" server and demonstrated what it said was the first instance of Unix (AIX) running native on the Intel I860 processor.

. . . .

A keyboard for all, and then some

The federal government's recently released *1990 U.S. Statistical Abstract* documents the phenomenal growth in the use of desktop computers. The number of workstations (including personal computers, terminals and word processors) in use at U.S. offices and factories increased from 6.5 million in 1984 to 25.3 million in 1989. The reference book, which draws on Gartner Group, Inc.'s database, said the ratio of keyboards to desk workers is now 1.02-to-1, up from 0.61-to-1 in 1984.

. . . .

X Windows gets AT&T approval

AT&T Computer Systems gave a nod to X Windows and graphics users last week, unwrapping two turnkey packages for those markets. The $5,400 DOS X-Terminal Solution allows users to run X Windows while providing simultaneous access to DOS applications. The package includes Transmission Control Protocol/Internet Protocol (TCP/IP) software. The $18,700 AT&T Graphics Workstation Solution provides high-performance graphics by bundling AT&T's Intel Corp. workstations with the Open Look graphical user interface and Intel 80386-based TCP/IP.

. . . .

Informix stretches Wingz

Informix Corp. launched its program to extend the Wingz spreadsheet to IBM Personal Computer graphical user interfaces, announcing support last week for Microsoft Corp.'s Windows 3.0 and for OS/2 Presentation Manager. Support for both PC environments is being shipped in a single package, a $500 program called the Wingz PC Bonus Pack.

. . . .

Tandem committing to Netmaster

Tandem Computers, Inc. and Systems Center, Inc. are expected today to announce that they are co-developing products to manage Tandem networks and systems. The products will be based on Systems Center's recently acquired Net/Master.

. . . .

White to head ACM

The Association for Computing Machinery has elected a new slate of officers. John White begins his two-year term as president of the 80,000-member group on July 1. White is associate manager of the computer resource laboratory at the Xerox Corp. Palo Alto Research Center in California.

. . . .

3Com works with rival Novell

Officials of local-area networking rivals 3Com Corp. and Novell, Inc. stood together last week as 3Com announced products designed to provide interoperability between 3Com networks and those based on Novell's Netware and other environments such as IBM's Systems Network Architecture networks and Apple Computer, Inc.'s systems.

. . . .

Industry publication closes

MIS Week, the publication that for 10 years has noted the comings and goings of so many players in the computer industry, will itself bow out as of tomorrow, its publisher confirmed last week. "We didn't get to complete our mission — but we didn't exactly fail, either, in that we went a long way toward setting parameters for the new MIS community," said publishing director F. Douglas DeCarlo of Fairchild Publications' decision to make the June 26 issue of the paper its last.

Repository

FROM PAGE 1

oversee the complex application development process and provide the critical integration of various computer-aided software engineering (CASE) tools. But the initial release, expected by June 29, will have limited functionality, and the integration capability for different CASE tools will not begin to be available until later this year.

IBM executives have said the initial release is targeted at tool developers and recommended that users focus on management and training issues relating to CASE as well as work with individual tools until the full-blown repository is available.

However, while industry attention has been focused on IBM's efforts, several other vendors have been promoting alternatives. AD/Cycle is IBM's architecture that is intended to someday replace existing methods of programming that are inefficient and costly and have resulted in oftentimes overwhelming backlogs. But it is little more than concept and a set of separate tools without the Repository Manager component.

Industry observers said they expect AD/Cycle will one day be the standard in the IBM world for application development, but in the meantime, many vendors are offering choices that include repositories and the necessary full-integration capabilities. Their selling point is AD/Cycle compatibility that will one day allow users to keep their tools and migrate to the IBM repository.

Pacific Bell has a development staff of 2,700 and greatly needed to bring consistency and order to its efforts, said Chuck Myers, the firm's director of data resource development.

"It's clear that we can't stand still," Myers said. "Our plan is to migrate to the AD/Cycle world as it comes up to some state of robust capability."

Pacific Bell is using a repository product and repository utilities from Brownstone Solutions, Inc. in New York, as well as various CASE tools from both Andersen Consulting and Knowledgeware, Inc. Installed in 1988, the Brownstone repository runs on DB2, and Myers' staff is currently modifying it with its own business and data models. At the same time, it is working to tie in Knowledgeware's Information Engineering Workbench product so that it can make use of the repository.

Brownstone said its product line, which includes administrative tools to work with the repository, will be AD/Cycle-compliant and its users can one day migrate to the IBM repository.

"There are no guarantees, but it's something we have to do," Myers said. "I don't think we have a choice. The larger question was what alternatives could we pursue while the repository was developed."

Rite Aid Corp. took a similar approach, although with a different cast of tools. It selected Asyst Technologies, Inc. in Chicago to provide a repository capability and is currently loading it with application-related data, said Bob Wall, data resource manager.

"You have to make a commitment to do something," Wall said. "You can't sit back and say, 'I made the right decision,' but you can say, 'I made the best decision for my organization at this moment,' " Wall said.

Like Myers, Wall has a commitment from his vendor that a migration to AD/Cycle will one day be possible. For now, however, Wall's staff is completing work on a meta-model — a conceptual look at Rite Aid's development process — and has begun loading this information into the repository.

Lubrizol's Sorani also said a migration to AD/Cycle is a possibility, although not in the near future.

"I just don't know because I don't know enough about what AD/Cycle is going to be," he said.

For now, Sorani's staff is getting ready to tackle the two development projects with TI's IEF. Sorani said he expects good results because IEF held up well in a recent pilot project that produced a time management system.

"I had some extra research and development money, so I used it to run the pilot," he said. "We completed it in less than 50% of the time we had budgeted for it."

CASE in point

In three recent announcements, independent CASE vendors have put forth their own repository approaches

■ **Andersen Consulting**

Upgraded its Foundation integrated CASE tool set and repository last month to support multiple hardware platforms

■ **Software AG of North America**

Released a repository engine earlier this month, based on its own Adabas, for a set of CASE tools called Predictcase

■ **CGI Systems**

Released a LAN-based version of its Pacbase suite of tools earlier this month that offers a repository running on an OS/2-based server or a link to a mainframe repository

Source: Computer Intelligence

CW Chart: Paul Mock

Paying for the future now

There's a tradeoff to everything.

IS shops committed to the IBM AD/Cycle way will not face migration issues in the future, but they also do not have full functionality today.

At New York Life Insurance Co., developers are working with three of the third-party CASE tools anointed as AD/Cycle tools, including Knowledgeware, Inc.'s Information Engineering Workbench, Bachman Information Systems, Inc. re-engineering tools and Index Technology Corp.'s Excelerator. But they have no way of sharing data among them.

"We'd like the integration to be here right now," said Lionel Brooks, systems engineer in the company's information resource management department. "We need it now."

Brooks said the company is currently reviewing two options for the near term. It can either rely on bridge products that tool vendors are providing to swap data between them or create a temporary central storage area for data, which can then be loaded into the IBM repository.

"I was somewhat disappointed that [Repository Manager] is not that comprehensive," Brooks said. "We've had the tools for about a year now, and we were anticipating that this Repository would have that integration there."

Depository Trust Co. is not in dire need of the integration capabilities but would like to get started on this track, said Emmanuel Ackerman, manager of data administration.

"Put it this way: If they could come out with a full-blown one today, we would probably run out and buy it, although we don't absolutely require it," Ackerman said. "We could use whatever they will give us."

ROSEMARY HAMILTON

SATISFACTION GUARANTEED

If you have been searching for a software company that can provide you with a wide range of software solutions, backed up by first-rate support, we invite you to join the over 6,500 MVS, VSE and VM users who have found long-term software satisfaction with SEA. Since 1982, we have been developing products based on your input and backing these products with support you can count on 7 days a week, 24 hours a day. The results have been impressive for both us and our users. With products licensed at one out of every three mainframe sites worldwide, SEA software has set new standards for efficiency and performance. Our over 6,500 licensed users include 9 of the Fortune 10, 85% of the Fortune 500 and thousands of other installations of all sizes and configurations. An equally important factor in measuring our success is our high level of user satisfaction, in which we take great pride.

SEA PRODUCT GROUPS

Operations Automation Group

SEA provides the most complete line of operations automation software. This is why over 2,500 users have chosen SEA as their source for automated operations.

- *ODDS* - Master Console Management.
- *$AVRS* - Sysout, Syslog and JCL Management, Viewing, Archival and Retrieval.
- *TRMS* - Report Management and Distribution.
- *CSAR* - Automated Job Scheduling MVS-VSE-VM.
- *TRAMS* - Data Transmission Management System.
- *QUICK TRAN* - Data Compression/Decompression for increased data transmission between mainframes or mainframes and PC networks.
- *SYNTHETIC JOBSTREAM* - Functionally verifies operating system and hardware changes before production implementation.
- *KEYS* - Problem/Change, Hardware/Software Inventory and Help Desk Management System.

Application Development/ Performance Measurement Group

SEA's Application Development and Performance Measurement products, used at over one thousand locations, help increase programmer, program and system productivity. They aid in application development for CICS, database systems and monitor program/system performance and operational dependencies.

- *PRO-2* - Application Development MVS-VSE.
- *PROFILE* - Performance Measurement and Analysis.
- *OHF* - Automate Creation of CICS Help Windows.
- *MRC* - Automated Critical System Factor Analysis in Online Color Graphic Form for Managers.

DASD/Data Management Group

SEA's DASD/Data management tools have become corporate standards, used in one out of every five MVS data centers worldwide. Our DASD management products provide dramatic savings under virtually any configuration and have set a new standard for efficiency and high performance.

We take very seriously our claim of being able to significantly decrease DASD expenditures in any MVS configuration. Our unique approach enables us to guarantee you significant savings in both short and long-term DASD cost. Take the opportunity to trial our products with no obligation and we will provide you with the same guaranteed results achieved by over 4,500 users, regardless of your installation's size or configuration.

- *PDSFAST* - High speed DASD Management, PDS Management, 100% IEBCOPY replacement.
- *FASTGENR* - High speed replacement for IEBGENER.
- *PDSUPDTE* - High speed global JCL/PDS editor.
- *PMF* - Automatic DASD Storage Management.
- *VCF/L* - ListC replacement, VSAM tracking and reporting.
- *VCF/M* - Automated VSAM optimization and allocation.

SEA has products that will save budget dollars and increase efficiency, whatever your installation's size or configuration. No other software company even comes close to matching our combination of a comprehensive line of high-quality software solutions, backed up by the highest levels of technical support. We invite you to join the thousands of installations who have found long-term software satisfaction with SEA products.

For further information regarding any of the above call 1-800-272-7322.

SEA™ *SOFTWARE ENGINEERING OF AMERICA*®
WORLD HEADQUARTERS • 2001 Marcus Avenue, Lake Success, New York 11042
Tel: (516) 328-7000 1-800-272-7322 Telex: 6973556 Fax: (516) 354-4015

Products Licensed In Over 40 Countries

Feds relax high-tech export controls

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — The U.S. Department of Commerce peeled away another layer of the red tape constraining exports of computers, telecommunications equipment and other high-technology items last week.

The agency's Bureau of Export Administration said that starting early next month it will allow license-free export to Western allies of computers with a processing data rate of up to 2G bit/sec. The new processing data rate is a government-developed measure that takes into account a variety of processing variables.

The eased restrictions will require individual export licenses for large mainframes and supercomputers. The new regulations apply to trade among the countries belonging to the Coordinating Committee for Multilateral Export Controls (Cocom), which include the U.S., Australia, Belgium, Denmark, France, West Germany, Greece, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Turkey, the UK and Canada.

Based on current levels of trade, the move will eliminate licensing requirements on some 85%, or $30 billion, of annual U.S. exports to Cocom countries, the Commerce Department said.

The relaxed regulations are the result of three years of work by Cocom countries, coming on the heels of an agreement by Cocom to substantially ease restrictions on the export of high-tech gear to the Soviet Union and Eastern Europe [CW, June 11].

A spokesman for Digital Equipment Corp. said the 2G bit/sec. threshold frees most of its computers for free export to Cocom countries. Only the five-processor VAX 6000-450, the six-processor VAX 6000-460 and the VAX 9000 mainframes lie above the limit, he said.

IBM officials were less impressed. "It's meaningless to us, and we're disappointed it didn't go further," a spokesman said. Sales of much of the company's products are not covered by Cocom export agreements because they are manufactured in those countries, the spokesman said. He added that IBM wants Cocom to become a completely license-free zone, a move that has considerable support in Congress.

3,000 honor Robert Noyce

BY JEAN S. BOZMAN
CW STAFF

SAN JOSE, Calif. — Red, white and blue balloons soared in a cloudless sky last week as Silicon Valley said farewell to Robert Noyce, father of the integrated circuit and co-founder of Intel Corp., who died suddenly on June 3.

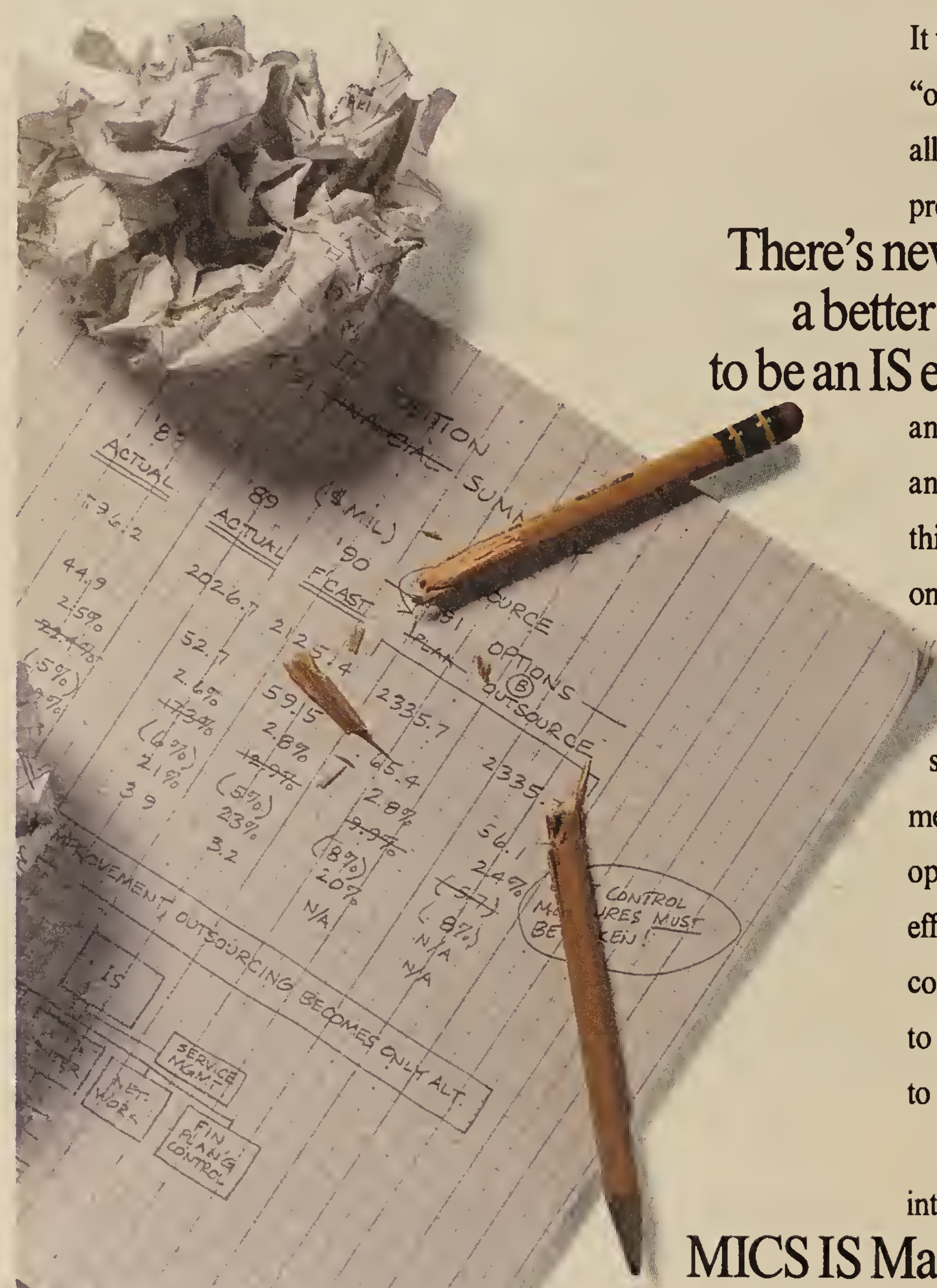
A crowd of 3,000 attended his memorial service at the San Jose Center for the Performing Arts.

Noyce, 62, moved to Texas two years ago to become director of Sematech, a federally funded consortium of semiconductor firms that develops chips designed to compete more effectively with Japanese semiconductors. "At the age of 60, when most of us start to take on less [work], Bob started moving a little faster and taking on more," said longtime friend and associate Arthur Rock, chief executive officer of Arthur Rock and Co., a venture capital firm.

Noyce received a U.S. patent for the first integrated "semiconductor device and lead structure" on April 25, 1961. In recent years, Noyce involved himself deeply in the Japan/U.S. technology struggle.

During the memorial service, Noyce was praised by Intel Chairman Gordon Moore, Intel CEO Andrew Grove and Wilfred Corrigan, CEO of LSI Logic Corp. "Bob was one of a handful of pioneers who set the foundation for the whole high-technology industry," Corrigan said.

IS customers are up in arms.
IS costs are out of control.
The CEO wants to outsource.



There's never been a better time to be an IS executive.

It wasn't that long ago when the CEO didn't know what "outsourcing" meant. Let alone what IS was doing. Well, all that's history. Because today, you're under increasing pressure to control costs *and* keep customers happy.

To respond, you must simultaneously manage heterogeneous computing and network configurations, contain and reduce IS costs, manage IS customer expectations, and capitalize on rapidly changing conditions. To do all this, you need accurate, timely, integrated information on costs, workloads and service levels. In other words, you need MICS from LEGENT.

MICS is the *only* comprehensive management solution available to IS executives. It's designed to measure and report on *all* aspects of your IS operation, allowing you to document the efficiency and effectiveness of your department. MICS also lets you compare the costs and performance of outside vendors to the in-house organization, so you're better prepared to respond to any outsourcing initiatives.

Remember, only MICS can provide the integrated IS management information you need to prosper in these tough times. To learn more, call your LEGENT account representative or call 1-800-877-8678.

MICS IS Management Support System

LEGENT

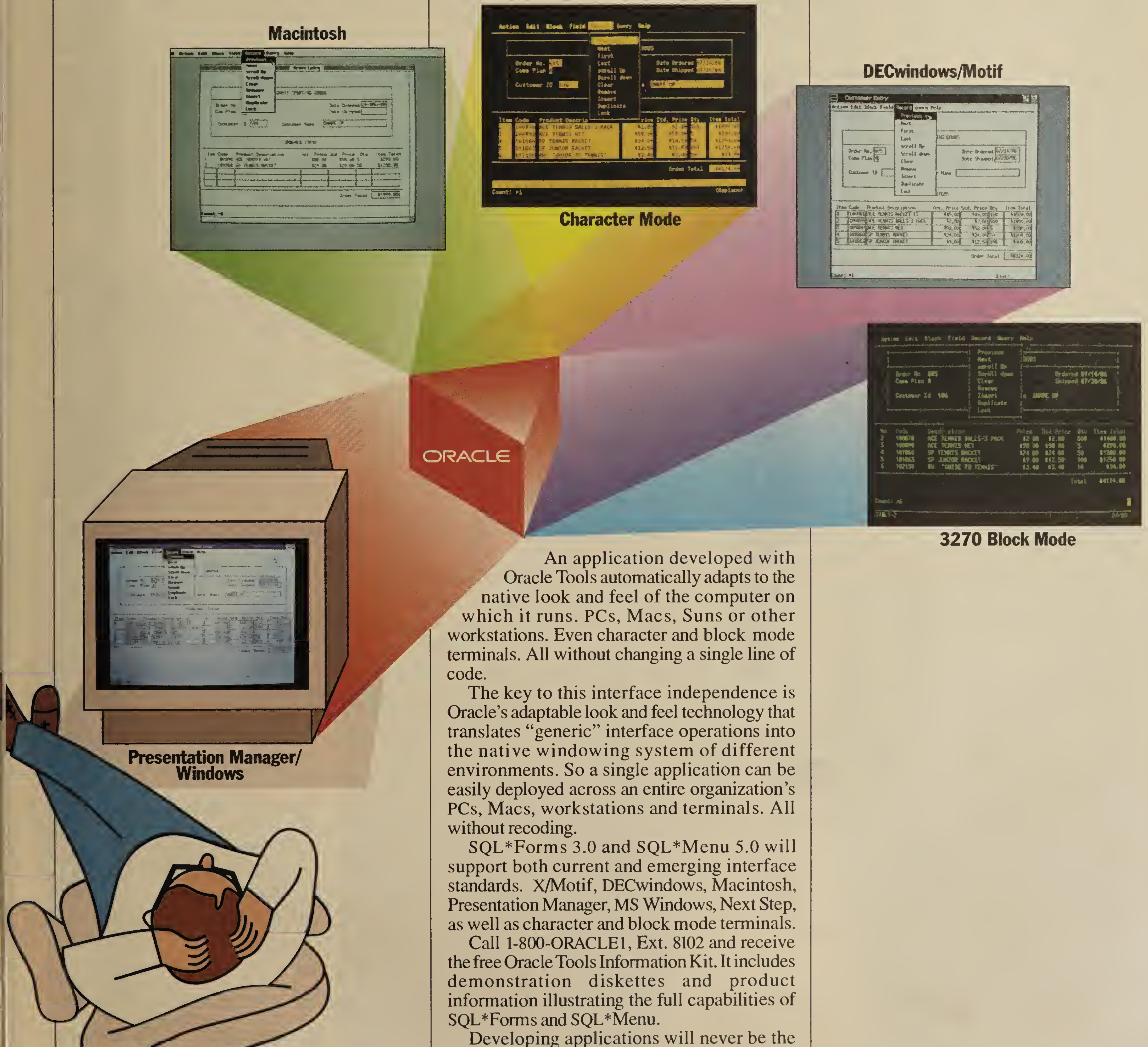
MICS operates in all MVS environments.
©1990 LEGENT All rights reserved. LEGENT is registered in U.S. Patent and Trademark Office.

Making The Same Look Different

Applications built using Oracle Tools automatically adapt to multiple user interfaces.

Developing a program that runs on the entire spectrum of PCs, Macs, Suns and other workstations is next to impossible. Because each computer has its own graphic user interface (GUI), developers must spend months rewriting each application for each incompatible GUI.

Unless the applications are built with Oracle Tools.



An application developed with Oracle Tools automatically adapts to the native look and feel of the computer on which it runs. PCs, Macs, Suns or other workstations. Even character and block mode terminals. All without changing a single line of code.

The key to this interface independence is Oracle's adaptable look and feel technology that translates "generic" interface operations into the native windowing system of different environments. So a single application can be easily deployed across an entire organization's PCs, Macs, workstations and terminals. All without recoding.

SQL*Forms 3.0 and SQL*Menu 5.0 will support both current and emerging interface standards. X/Motif, DECwindows, Macintosh, Presentation Manager, MS Windows, Next Step, as well as character and block mode terminals.

Call 1-800-ORACLE1, Ext. 8102 and receive the free Oracle Tools Information Kit. It includes demonstration diskettes and product information illustrating the full capabilities of SQL*Forms and SQL*Menu.

Developing applications will never be the same. Or different.

ORACLE®

Compatibility • Portability • Connectability

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

IBM backs up pledge to support net standards

BY ELISABETH HORWITT
CW STAFF

NEW YORK — IBM provided more hard evidence of its good faith in standards support last week, announcing a bevy of TCP/IP and OSI products that included its first practical implementation of OSI over an IBM Systems Network Architecture host network, sources said.

IBM's Open Systems Interconnect (OSI) Remote Programming Interface Feature is said to eliminate the need to implement IBM's OSI Communications Subsystem — a bulky, $50,000-plus software system — on every VM- or MVS-based mainframe that needs to talk to an OSI environment. Instead, users can implement the subsystem on one mainframe, which then acts as a gateway to the OSI environment for all other systems on the SNA network, according to IBM.

With this announcement, "I have to say that IBM is serious about OSI," said Thomas McDonald, senior analyst at Framingham, Mass., consulting company MGT Technology Group.

However, The Travelers Corp.'s hosts may not have much use for practical OSI networking, given that the standard will be just one protocol among many on distributed networks that often require no host involvement, said Robin Layland, engineering consultant at The Travelers.

Of more potential use to The Travelers, Layland said, was IBM's position statement that OSI Communications Subsystem will support the OSI Network Management Forum's recently released specifications, migrating from there to the International Standards Organization's standard as soon as it is finalized.

IBM's OSI position statement also included a commitment to support the X.500 directory standard. The Travelers is currently struggling to keep track of users and resources across multiple local-area networks corporatewide, Layland said. Doing this without a common directory system such as X.500 "is like having everyone's phone number on a piece of paper," Layland said.

IBM further expanded its support of industry networking standards last week with the following introductions:

- Implementation of full OSI standards on Advanced Interactive Executive/6000 systems. The software is said to comply with government OSI specifications for File Transfer and Access Method and X.400 electronic mail protocols and for gateways that allow OSI and Transmission Control Protocol/Internet Protocol (TCP/IP) applications to exchange electronic messages and files, IBM said.
- The addition of Simple Network Management Protocol (SNMP) support to IBM's TCP/IP software for VM. This allows VM systems to manage IBM and other vendors' TCP/IP network devices and to pass TCP/IP management information on to Netview, IBM said. IBM also announced its intention to provide equivalent SNMP support on MVS.

Also last week, IBM announced the Distributed Console Access Facility, which is said to allow an OS/2 Extended Edition user to "take control of a PC-DOS or OS/2 keyboard" at a remote site, IBM spokesman Curt Dunbar said.

Expanding LANs

In addition to broadening support for networking standards last week, IBM expanded the capabilities of the local-area network products that provide the underlying transport for such protocols.

The IBM Token-Ring Network Bridge Program Version 2.2 is said to allow LAN users to access resources on other remote LANs via a dial-up connection. The earlier version only supported dedicated connections, which are both more expensive and less flexible.

The following were also announced:

- A commitment to announce over the next two years several LAN products to conform with the Fiber Distributed Data Interface standard, including bridges to Ethernet and Token-Ring, direct workstation and host attachments and network management products.
- Version 1.2 of IBM's LAN Support Program, which is said to allow IBM PC-DOS users on Ethernet LANs to communicate with IBM SNA hosts and with Token-Ring LAN stations via IBM's 8209 LAN Bridge.
- A new version of Trace and Performance software and adapters, which are said to allow users to isolate problems and determine SNA traffic patterns, TCP/IP and Netbios systems on a 4M or 16M bit/sec. Token-Ring network. The previous version only handled 4M bit/sec. LANs and could not handle TCP/IP transmissions, according to IBM.

ELISABETH HORWITT

DB2™
PRODUCTIVITY
PERFORMANCE
...PARITY™ DBSS

Within
The Edit Session:

Functions
- Builds, tunes, tests and times SQL
- Provides an interactive tuning guide
- Hosts a complete on-line tutorial
- Standardizes SQL
- Delivers a comprehensive plan analysis

Features
- Contains an Artificial Intelligence System, providing extensive SQL performance analysis
- Supports all languages, QMF and SPUFI
- Analyzes and tests SQL from code generators and 4GLs
- Operates as primary ISPF commands

Benefits
- Cuts development costs by 20% or more
- Tunes, tests and times SQL before the first pre-compile
- Minimizes programmer demands on DBAs' time
- Reduces CPU cost
- Requires no special education
- Promotes programmer awareness of efficient SQL

Try PARITY on a 60 day free trial basis.
Call today to arrange an on-site demonstration.

Paragon Software International
One North Plaza
P.O. Box 345
Bogota, N. J. 07603
(201) 641-8203 • 1-800-462-5582

PARITY™ DBSS | THE DEVELOPMENT PARTNER .... for DB2

CHARTER VENDOR MEMBER
INTERNATIONAL DB2 USERS GROUP

© 1990 Paragon Software International

Oracle Financials keep Burlington Coat comfortable year-round.

"We were dying under the weight of obsolete computing. We needed an integrated financial system with a user interface that wouldn't cause a mutiny. Not only did Oracle Financials deliver over one million invoice transactions this season, but it delivered a 100% happy user base."

Bob LaPenta, Controller and Chief Accounting Officer, Burlington Coat Factory

With over 150 stores around the country, Burlington Coat's biggest sales job was internal. Even though they had an impossible-to-maintain, home-grown accounts payable, expenses and general ledger system, their employees knew how to use it. They knew the work-arounds and the pitfalls. They also knew the 1989 buying season would be a nightmare. So they were willing to give the Oracle Financials™ family of products a close look.

The intuitive screens impressed them immediately, because Oracle Payables had a familiar feel. But they were literally rescued by the ability to modify vendor information on the fly. For example, their suppliers may have financed production with multiple lenders, or factors, who needed to be paid directly. Burlington's old system made this a continuous but necessary nightmare of overtime, workarounds and manual entries. Oracle Payables completely eliminated this headache.

A successful season and a million invoices later, Burlington Coat keeps their business warm with Oracle Financials.

Find out how the complete suite of Oracle Financials products—Oracle General Ledger, Oracle Purchasing, Oracle Payroll, Oracle Assets, Oracle Receivables, Oracle Revenue Accounting, Oracle Inventory, Oracle Order Entry, Oracle Sales Analysis, Oracle Payroll, Oracle Personnel, Oracle Alert—can keep your business out of the cold. They're so easy to learn and use, you can probably use our documentation to warm your own house.

ORACLE®

Call **1-800-ORACLE1, ext. 8195** today, to schedule a demonstration of Oracle Financials. The experience will be a profitable one for you.

Oracle Financials

U.S. SEMINARS

AR	Little Rock	Aug 7
AZ	Phoenix	Jul 24f Jul 24
	Sierra Vista	Jul 19c July 19
	Tucson	Aug 7f Aug 7
CA	La Jolla	Aug 2c Aug 2
	Los Angeles	Jul 31f Jul 31 Jul 31i Aug 21f Aug 21
	Newport Beach	Jul 17f Jul 17 Aug 16c Aug 16
	Riverside	Jul 12f Jul 12
	Sacramento	Jul 26f Jul 26
	San Diego	Jul 17f Jul 17 Jul 19f July 19
	San Francisco	Jul 12c Jul 12 Aug 9f Aug 9l
	Santa Clara	Jul 18 Jul 18l Aug 17c Aug 17f
CO	Denver	Jul 19f Jul 19
CT	Stamford	Jul 24f Jul 24
DC	Washington	Jul 24c Jul 24 Aug 7 Aug 21 Aug 21s
FL	Jacksonville	Jul 19f Jul 19
	Melborne	Aug 16c Aug 16
	Miami	Aug 14 Aug 14l
	Tampa	Jul 13f Jul 13
GA	Atlanta	Jul 10f Jul 10
IA	Des Moines	Aug 16c Aug 16
ID	Boise	Jul 26
IL	Chicago	Jul 17c Jul 17 Aug 2f Aug 21 Aug 21i Aug 21l
IN	Ft. Wayne	Jul 24f Jul 24
	Indianapolis	Aug 1c Aug 1
KS	Wichita	Jul 10c Jul 10
KY	Louisville	Aug 23f Aug 23
LA	New Orleans	Aug 2c Aug 2
MA	Burlington	Jul 27f Jul 27
MD	Baltimore	Jul 19f Jul 19
MI	Dearborn	Aug 21f Aug 21
MN	Minneapolis	Jul 10c Jul 10
MO	Kansas City	Aug 2f Aug 2 Aug 14
	St. Louis	Jul 19f Jul 19 Aug 16
NJ	Iselin	Jul 10f Jul 10 Aug 7c Aug 7
NM	Albuquerque	Jul 26f Jul 26
NV	Las Vegas	Aug 14
NY	Buffalo	Jul 24f Jul 24
	New York	Jul 11f Jul 11 Jul 25c Jul 25e Jul 25 Jul 26l Aug 15 Aug 15l Aug 29 Aug 29i
	Syracuse	Jul 26f Jul 26
OH	Cincinnati	Jul 12
	Cleveland	Jul 5f Jul 5
	Columbus	Aug 16f Aug 16
OK	Oklahoma City	Jul 17c Jul 17 Jul 18f
	Tulsa	Jul 18 Jul 19f
PA	Allentown	Jul 17c Jul 17
	Harrisburg	Jul 19f Jul 19
	Malvern	Aug 21f Aug 21
	Pittsburgh	Aug 9c Aug 9
RI	Providence	Jul 12f Jul 12
SC	Greenville	Jul 18f Jul 18
TN	Memphis	Jul 17 Aug 23
	Nashville	Aug 7f Aug 7
TX	Austin	Aug 15f
	Dallas	Jul 10c Jul 10 Jul 11f
	Ft. Worth	Jul 24
	Houston	Jul 17f Jul 19 Jul 19l Aug 21f
	San Antonio	Aug 3c Aug 3 Aug 16f
UT	Salt Lake City	Jul 17f Jul 17 Aug 23c Aug 23
VA	Norfolk	Jul 31c Jul 31
	Reston	Jul 17f
WA	Bellevue	Jul 24f Jul 24 Aug 23f Aug 23i
WI	Madison	Aug 15f Aug 15
	Milwaukee	Jul 18c Jul 18

Use the following key for identifying the special afternoon sessions that are offered with the seminar dates above.

c	CASE/Application Tools
f	Oracle Financials
l	Oracle Mail
i	IBM
e	Educational Tutorial
s	Secure Systems

Attn: National Seminar Coordinator
Oracle Corporation
20 Davis Drive
Belmont, California 94002
1-800-ORACLE1, ext. 8195

☐ My business card or letterhead is attached. Please enroll me in the *FREE* Oracle Financials seminar to be held

at: __________________

on: __________________

COMPUTER.WORLD

Copyright © 1990 by Oracle Corporation. ORACLE is a registered trademark and Oracle Financials is a trademark of Oracle Corporation. TRBA

Imaging technology offers more than just paper gains

BY ALAN J. RYAN
CW STAFF

TYNGSBORO, Mass. — If there is one clear message information systems professionals who are exploring imaging technology should keep in mind, it is that the technology is not a flash in the pan.

Instead, imaging and optical storage technologies are the natural evolution of the computer age, said speakers at last week's "Image Tech: Solutions for the '90s" conference held at Boston University's Wang Institute.

Companies that are already using imaging heavily, such as American Express Co., US West, General Electric Co. and the Grumman Aircraft Systems Division of Grumman Corp., will reap the most benefits from the technology, said Robert F. Williams, president of Cohasset Associates, Inc., a Chicago-based management consulting firm.

"We lose time with the old system, and time is money," Williams said.

The imaging market is growing rapidly, said Gregory C. Van Buren, consultant at the electronics, information and telecommunications unit of Arthur D. Little, Inc.'s industry management section. "Document image processing is the fastest growing segment of worldwide data processing," and by the year 2000, it will be a normal aspect of the data processing process, Van Buren added.

Beyond paper reduction, image technology is especially beneficial when used in areas such as health care, where X-ray images can be stored and medical information updated in real time, according to Richard Schwarz, first vice-president of electronic imaging at Shearson Lehman Hutton, Inc.

Imaging technology will also change the ways in which companies do business in the future by refocusing the labor intensity involved in the retrieval of information, Williams said. Tangible benefits the technology can provide include the following:

- Productivity improvements. Document communication today still delivers in "people time," with those needing the information walking across an office, sending a message or retrieving information through the mail system.
- Reduction of staff needed to manage files.
- Space and equipment savings. One 12-in. optical disc can hold approximately 50,000 business letters.
- Savings on supplies.
- Litigation costs. Williams said one of his clients, a power company, calculated that it spent $15 per page to locate and produce documents needed during litigation. By putting that information on optical disc, the company reduced that figure to $4 per page.
- Audit trail. Systems will be able to track systems usage, use of documents, etc.
- Current and complete documents. Information is updated on-line and in real time, providing complete details in areas such as medical records updating for a patient needing surgery and the latest manufacturing specifications for a product.

Imaging technology will bring about the following intangible — but important — benefits as well, the conference speakers said:

- Ability of files to be accessed from multiple locations within seconds, eliminating the need to mail documents.
- Multiple methods of retrieval using key words, etc.
- Improved customer support.

Imagine that

We will never live in a paperless society, but paper — the old standby — is bulky, costly to store and easily lost or destroyed. Image-processing technology is an alternative that can help.

- Ninety-five percent of all documents reside in file cabinets.
- Executives spend more than 150 hours annually looking for information that was misplaced, misfiled, mislabeled or just plain missing.
- Corporate documents are growing at a rate of 20% annually.
- Cost of a misfile averages $120.
- Cost per filing inch for annual maintenance is $11.
- Cost of owning and maintaining a standard five-drawer file cabinet is $880 annually.
- A 5¼-in. optical disc holds approximately 8,000 business letters (equivalent to one four-drawer filing cabinet).
- A 12-in. optical disc holds approximately 50,000 business letters (equivalent to 25 drawers of paper files).
- Twenty-five drawers of paper filing cabinets consume 18,700 cubic inches of space.

Anyone who says they can integrate SNA, TCP/IP and OSI must be from Jupiter.

Ask most communications companies about their capabilities and they'll tell you the sky's the limit. Just don't ask them to interconnect TCP/IP, SNA and OSI.

At Jupiter Technology, we understand that new networks must work with established networks and that integration must be smooth and transparent to your users.

Needless to say, it takes more than lip service to integrate multiple networks for Boeing, General Electric, NASA and others. It takes the backing of a $3 billion company with the proven expertise that only Jupiter Technology can provide.

Take a closer look at Jupiter. Call 1-800-525-4790 and ask for Literature Packet #JT01.

Because interconnectivity is no place to have your communications supplier explore the outer limits of their capabilities.

JUPITER
TECHNOLOGY
AN INTEL COMPANY

© 1990 Jupiter Technology, Inc

BRING AN EXPERT INTO FOCUS.

INTRODUCING LEVEL5 FOR FOCUS. THE ONLY 4GL INTEGRATED WITH AN EXPERT SYSTEM.

Now you can meet your company's ever-growing demands for better information with the only proven 4GL to integrate the power of expert systems technology. We call it LEVEL5 for FOCUS. You'll call it The Expert 4GL.

LEVEL5™ for FOCUS is a complete application-development environment that combines 4GL tools and data management with a fully optimized rule-based inferencing system. Now you can create a new generation of FOCUS applications that capture and apply knowledge. The rules and regulations, policies and procedures on which every company relies. You can turn simple decision support into advanced decision management.

FOCUS is proven technology for accessing, manipulating, and storing data. For the first time, strategic knowledge can be consulted from any of these critical functions from any point in your application. And since you can do this from many applications, you can better address consistency and maintenance across your organization.

It's from Information Builders, so you can apply these unique capabilities to data in every file and database in your IBM or DEC data center including DB2, SQL/DS, IMS, Rdb, DBMS, and RMS.

Only Information Builders provides seamless integration between the most widely used 4GL and the fastest growing expert system to give you The Expert 4GL. Now give your applications the power to deliver the best information. Contact Information Builders, Inc., 1250 Broadway, New York, NY 10001, or call 212-736-4433 ext. 3700.

LEVEL5 for FOCUS

INFORMATION BUILDERS, INC., 1250 BROADWAY, NEW YORK, NY 10001

212-736-4433 Ext. 3700

Toil

Purchasing Digital's full line of workstations and most popular MicroVAX™ products has never been easier.

Just pick up your telephone and call our name: 1-800-DIGITAL.

Our DECdirect™ team will help you every step of the way, with product, price and purchasing information. You'll reduce the time and paperwork of traditional purchasing, and deal directly with Digital while making your important workstation and MicroVAX purchases.

❑ ORDER WORKSTATIONS AT NEW, LOW PRICES.

Call and choose from our convenient packaged workstations. Or customize your own system over the phone.

It's the easiest way to take advantage of our new, low prices on the much-in-demand VAXstation™ 3100 and DECstation™ 3100. Plus our VAXstation™ 3520/3540 products, and our DECstation™ 2100 and 5000 family of products. Of course, our popular DECstation™ 200/300 series of PC's is also available.

❑ CALL TO ORDER POPULAR MICROVAX PRODUCTS.

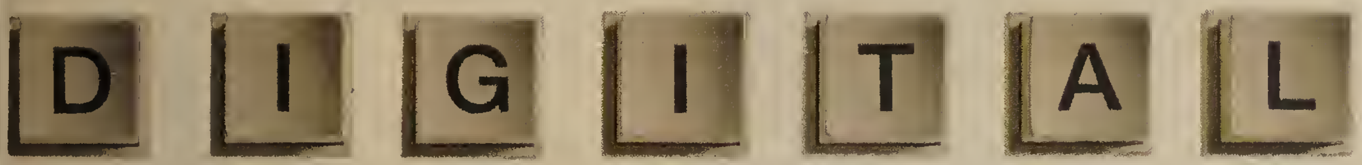
DECdirect is also your source for our most popular MicroVAX™ products, including our packaged MicroVAX™ 3100 system and custom packages of MicroVAX™ 3300/3400 and VAXserver™ 3300/3400 systems.

And while you're shopping, you can also order Digital's supplies, software, terminals, servers, drives, communication options and much more, all with the same toll-free call.

© Digital Equipment Corporation 1990. The DIGITAL logo, Digital has it now, DECdirect, VAXstation, VAXserver, DECstation and MicroVAX are trademarks of Digital Equipment Corporation

digital™

Free.



❑ FAST ORDERING, DIRECT FROM DIGITAL.

DECdirect is the perfect complement to ordering from your Digital representative or authorized distributor. Your discounts will be automatically applied. Your purchase confirmation will be mailed the next day. And every price quoted is guaranteed for 60 days, in writing at your request.

We can even introduce you to our Electronic Store, our free on-line service that lets you browse and purchase from your desktop terminal or PC. It's another easy way to order our full workstation line, our packaged MicroVAX 3100 system, and much more.

❑ COMPREHENSIVE PRODUCT INFORMATION.

Throughout your purchasing process, you can get the most up-to-date pricing and availability information, configuration data, and warranty and service details.

All to help you make the most informed purchase possible.

❑ FREE STARTER KIT.

Call 1-800-DIGITAL and mention code AAL. That's all it takes to place an order, request technical information, or get a free DECdirect starter kit including a subscription to the DECdirect catalog and the Electronic Store Shopper's Guide.

DECdirect. It's the easiest way to get our workstation and MicroVAX products now.

Digital
has
it
now.

Japanese IS sites hold on to their mainframes

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Though small computer shipments are rapidly increasing in the U.S. and Europe as part of the spread of personal computer and workstation networks, Japanese users will continue to keep the mainframe as the center of their distributed networks for the foreseeable future. That was the conclusion of an International Data Corp. Japan Ltd. (IDC Japan) seminar held last week.

In Japan, the value of PC shipments still accounts for less than 30% of total computer shipments. In the U.S., it is about 50%, and in Europe it is substantially larger than 40%, according to Yuji Ogino, president of IDC Japan.

By comparison, in 1989, large-scale systems made up 30% of total shipments by value in Japan, while they represented less than 20% in the U.S. and will soon drop to less than 20% in Europe, he said.

The reasons for the dominance of large-scale systems in Japan include the centralized management of Japanese companies and their hierarchical business relationships, user aversion to keyboards in an ideographic-based culture and limited use of local-area networks and packaged software, as well as few available software development tools.

Software prices continue to be high compared with those in the U.S. and Europe.

"This prevents end users from using [smaller] computers on a departmental level," Ogino said.

Specialized office processors, which are priced lower than small-scale mainframes and rank as small systems, continue to be widely used in Japan, mainly because they have more software packages available for them. Currently, there are more than one million office processors being used in Japan.

Ogino said it will take three to four years for LANs to take hold. In the U.S., four million to five million PCs — or about 10% of the total installed base of PCs and workstations — are connected by LANs. In Japan, only 40,000 to 50,000 — or about 2% — operate on LANs.

One of the reasons for the slack PC growth is that NEC Corp., which dominates the Japanese PC market with a 50% share in units for its PC98 series, will not quickly change over to OS/2, according to Ogino.

SQL connections may not live up to expectations

BY CHARLES VON SIMSON
CW STAFF

SCOTTS VALLEY, Calif. — Jockeying for position in the developing market for SQL connectivity between personal computer front ends and large system databases, Gupta Technologies, Inc. and Borland International recently announced new products. Analysts, however, picked "caveat emptor" over "connectivity" as the slogan for the emerging market.

"I can assure you that these products will not work as advertised for a while," said Rich Finkelstein, SQL database analyst at Performance Computing, Inc. in Chicago. "More than any other part of the industry, SQL product announcements have been like a black hole in the sky. They promised functions and disappeared without a trace."

"This is a new market, and vendors want to get into it for positioning reasons," said George Schussel, president of Digital Consulting, Inc., a consulting firm in Andover, Mass. "More than in most areas, the first versions of SQL products are typically underwhelming."

Gupta announced that it has shipped SQL Network for Oracle, a database system that allows PCs to connect to Oracle Systems Corp.'s Oracle data on microcomputers, minicomputers and mainframes.

Borland said that the next version of its Paradox relational database manager will also support Digital Equipment Corp.'s RDB/VMS database. Borland has already said that the version will support connections to Microsoft Corp.'s SQL Server, IBM's OS/2 Extended Edition and Oracle databases.

Umang Gupta, president and chief executive officer of Gupta Technologies, said that his company's new product had gone through extensive beta testing and was a stable, solid product that works today.

However, Schussel pointed out that even if a system is solid, SQL connection vendors are typically dealing with another vendor's database system. "They only control their own destiny to a very limited extent," he said. "There have been few products where the initial version did not contain a few surprises."

Gupta already has a product that connects to IBM's DB2 database, and Borland said only that its product will ship this year. The largest of the PC database companies, Ashton-Tate Corp., is still struggling to get an SQL version of its Dbase IV product out the door.

Integrated technical computing in an integrated world economy

Can you afford the inefficiency of integrating your own system? Multiple user interfaces. Conflicting data formats. Separate islands of computing. Not anymore.

These days you need the power to share information easily. With anyone. Anywhere. At any time. And you get it from Intergraph.

Highest level of integration in the industry
Intergraph gives you a highly efficient workflow. From concept to manufacturing. Using the world's largest portfolio of integrated technical applications. Mechanical, electronics, architectural, utilities, GIS/mapping, and electronic publishing, to name a few.

Our industry-standard systems – with a Macintosh-like user interface – let you function in a truly multivendor environment. Linking engineer to engineer, department to department, and database to database. In a single facility. Across a continent. Or around the world.

Extending your reach
If your company plans to do business in a worldwide market, remember Intergraph. Other companies are just beginning to talk about integration. We've already delivered it. Call us today. U.S.: 800-826-3515. Canada: 403-250-6100. Or contact your Intergraph representative.

INTERGRAPH
Everywhere you look.

Intergraph is a registered trademark and *Everywhere you look* is a service mark of Intergraph Corporation. Other brands and product names are trademarks of their respective owners. Copyright 1990 Intergraph Corporation

Real-World WANs.

For a school district, every dollar spent on networking means one dollar less for classrooms. And playgrounds.

A school district is just like a business: every dollar counts. That's why more and more school districts—and businesses—are discovering the real world advantages of creating a Wide Area Network (WAN) through their local phone company. Working with AT&T Network Systems, your local phone company can show you how the AT&T DATAKIT® II Virtual Circuit Switch could network all your computers. Efficiently. Quickly. On existing twisted pair phone lines. The results for school districts? Potentially thousands of dollars in savings. And if a WAN can do that for a school district, think of what it could do for your company. Get smart. Call your local telephone company marketing representative or call 1 800 638-7978, ext. 2210.

You and Your Local Phone Company

AT&T
Network Systems

© 1990 AT&T

ADVANCED TECHNOLOGY

TECH TALK

Agreeing en masse

■ The major Japanese and U.S. laptop computer makers, as well as top software vendors, agreed recently on standards for integrated circuit memory cards for laptop computers. Standards for the credit-card-size devices, designed to supplement floppy and hard disks, will make it possible for companies to begin designing products for the mass market. One obstacle is that the cards are priced higher than the going rate for floppy disks. However, standards will allow integrated card makers to mass-produce the devices and attract more companies to the business, thus eventually causing prices to fall.

....

RIPE for robots

■ Computer scientists at Sandia National Laboratories have developed an object-oriented programming environment designed to speed the process of developing software for robots and improve programmer productivity, among other benefits. The Robot Independent Programming Environment (RIPE) allows programmers to extend software code developed in one robotic application to other applications, scientists said. RIPE has been used in Sandia's laboratories in a demonstration of robotic cask handling operations for possible use in nuclear waste facilities.

....

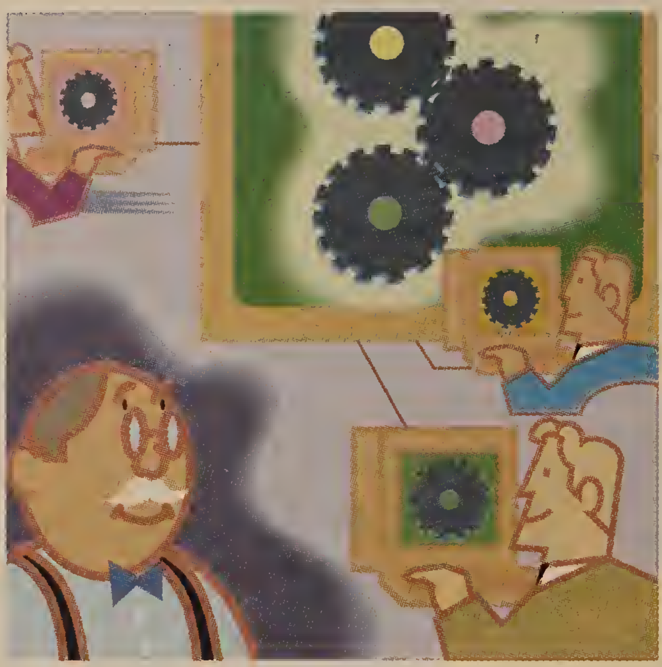
All in one

■ Combine printer, copier, scanner and fax and what do you get? A multifunction peripheral, according to BIS CAP International. The Norwell, Mass.-based market research firm said such ubiquitous machines represent an untapped $1.5 billion opportunity for information processing and electronic imaging vendors. A recent report by BIS CAP concluded that 350,000 combination units will be in place by 1994. The trick will be to convince potential buyers that multifunction peripherals are something more than just a gimmick, the report concluded.

Meetings that aren't hard to take

Researchers say putting PCs into the equation adds up to fun, productive sessions

BY MICHAEL ALEXANDER
CW STAFF



The next time you are in the mood to clear out a barroom, try this: Announce that you are going to have a meeting. No one, it seems, likes business meetings because too often they are time-consuming and frustrating.

However, several researchers and a smattering of corporations say that meetings can be fruitful — even fun. All it takes is some personal computers to help things along.

At a computer-supported or electronic meeting, attendees sit at PCs, linked in a local-area network and evenly spaced around a large, horseshoe-shaped table. The PCs run groupware designed to enable the participants to electronically brainstorm, individually and collectively; mediate conflicts; and analyze proposals.

The PCs also permit attendees to vote on issues and display the results. The output is displayed on a wall-size projection television screen, mounted on the wall at the open end of the horseshoe. At the end of the meeting, group members receive a hard copy of the proceedings.

What makes the session work is that each participant's input is tossed without attribution into an electronic hopper of sorts. Researchers have found that participants are considerably more candid when protected by anonymity, said Lynda Applegate, an assistant professor at Harvard University's Business School.

Applegate and fellow researchers at Harvard and the University of Arizona have studied computer-supported meetings using the specially constructed MIS Planning and Decision Laboratory at Harvard. IBM has funded research efforts to refine the concept and has set up several electronic meeting rooms of its own.

Meeting attendees no longer fear social disapproval by fellow group members, anxiety about oral communication skills or the presence of a boss, among other recognized inhibitors of group performance, according to Applegate.

One objective of these electronic encounter groups is to spin out as many ideas as possible. To do that, the attendees are encouraged to toss out ideas, no matter how radical, and to hitchhike on the ideas of others. To keep the creative juices flowing, criticism of ideas is ruled out.

The electronic meetings can also dramatically speed decision-making, allowing marketing executives to develop a plan for launching a product in hours instead of days, for example.

The end product is hammered into shape during the meeting itself rather than after the meeting breaks up, as is usually the case. Participants see that everyone is contributing and feel compelled to put in their vote, Applegate said.

The idea of using computers to facilitate coming up with ideas and making decisions is getting a close look by managers at several corporations these days.

"Most companies are recognizing that teams are an important part of the organization and are much more aware of the need to support team work," Applegate said.

Computer-aided meetings are neither a panacea for all problems nor appropriate for every company.

If the group processes are already poor, then the technology can only make matters worse. The corporate culture must support an environment where subordinates can express opinions on par with their managers.

Electronic meeting rooms will never fully replace face-to-face discussion, according to researchers. In fact, in the prototype electronic meeting room, the PCs can be moved out of sight, which would allow participants to verbally interact when that is called for.

FRISC-y chips giving new meaning to speed

BY CHRISTOPHER LINDQUIST
CW STAFF

Speed may kill on the highways, but it is a rule of the road for the microprocessor industry. But no matter how fast the newest chip may be, it is never fast enough.

Researchers at Rensselaer Polytechnic Institute in Troy, N.Y., for example, are working on a fast reduced instruction set computing (FRISC) device that makes ordinary chips appear to operate in slow motion.

The FRISC processor has a peak performance of 250 million instructions per second (MIPS). Even at 250 MIPS, the FRISC processor is seen as little more than a pit stop in the race to develop even faster microprocessors.

Jack F. McDonald, a professor at RPI and one of the developers of the processor, said the final goal of the FRISC chip is miles away. RPI has been given a three-year charter by the Defense Advanced Research Projects Agency (DARPA) to design a processor capable of one billion instructions per second.

"Within this decade, we will have a one billion instruction per second processor that you can hold in the palm of your hand," McDonald said.

One of the hopes for the project is to produce the processor "cheaply enough for high-end workstations for the common man," he added.

Not all hunky dory

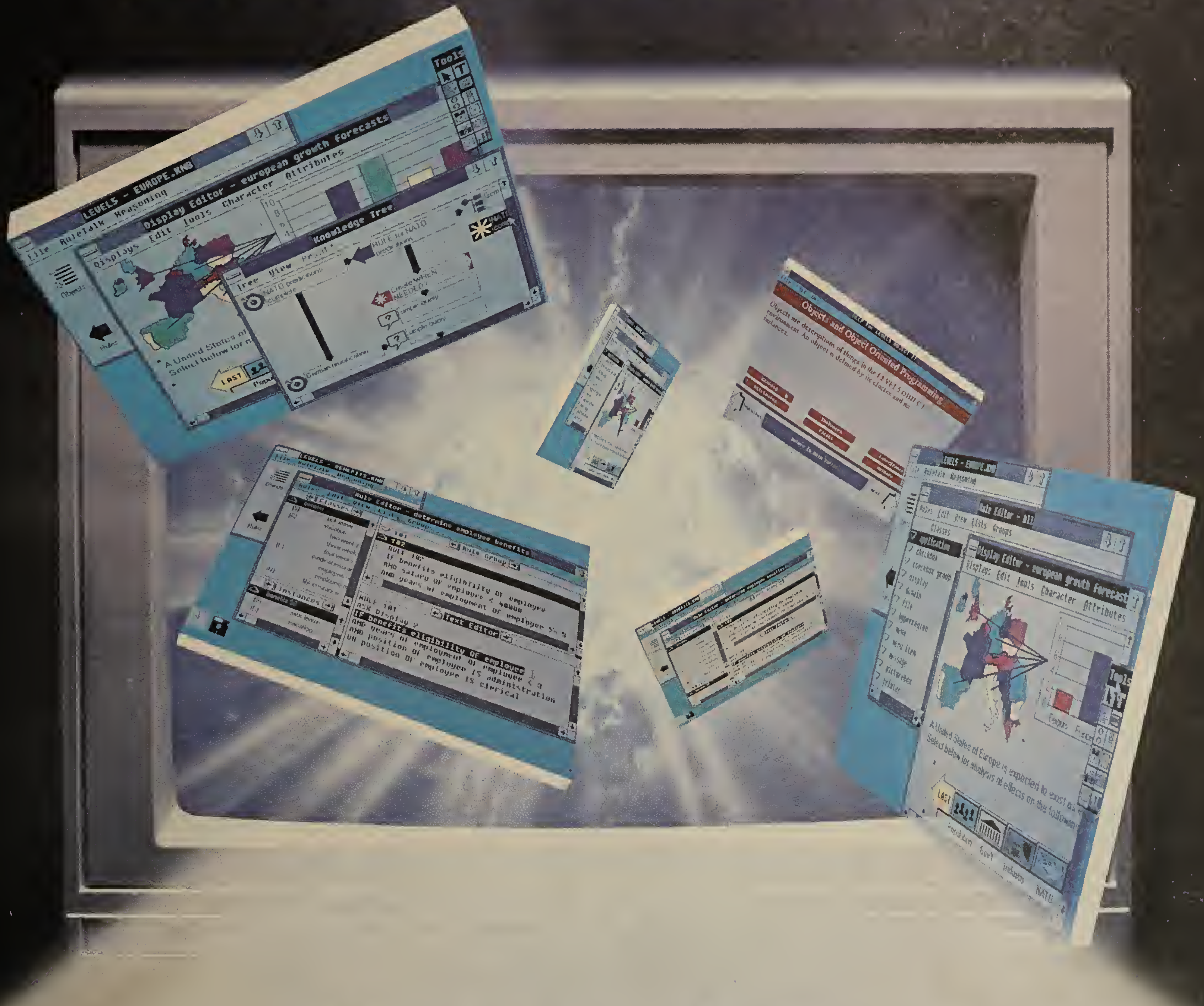
There are problems associated with such high-speed processors, however. DARPA has requested that processors in the project run Mach as an operating system and use C as a language, but according to McDonald, software development for such a processor could cost "tens of millions of dollars."

Another question is whether one needs such speed on the desktop. Perhaps not yet, but Dean McCarron, vice-president of technology at In-Stat, Inc. in Scottsdale, Ariz., said that 100 MIPS in a top-end personal computer will "be guaranteed by 1994 to 1995."

As for what will be done with this newfound speed, McCarron said, "It's dramatically going to change how we interact with the PC and what the PC does. I think you're going to see a lot more video-oriented PC applications."

James Reinhart, manager of marketing and application engineering for Motorola, Inc.'s 68000 microprocessors, said the need for compatibility must always be weighed into the equation. "We certainly want to show the world how to put a 100-MIPS box on the top of their desk within the next five years, but we have some pretty realistic sets of goals surrounding that."

INTRODUCING LEVEL5 OBJECT™


LEVEL5 - EUROPE.KNB
Display Editor - european growth forecasts
Knowledge Tree
Tools
Objects and Object Oriented Programming
Rule Editor - determine employee benefits
Text Editor
Display Editor - european growth forecasts

THE POWERFUL OBJECT-ORIENTED EXPERT SYSTEM IN WINDOWS.

With LEVEL5 OBJECT, you get something new in expert systems.

Power. And ease of use.

The power of an object-oriented database manager driven by forward and backward chaining inference engines. The power of demons, pattern matching, and database interfaces. The power of rules, hypertext, agendas, and triggers.

In short, the power to develop sophisticated applications quickly.

And easily. LEVEL5 OBJECT lets you take full advantage of the familiar point-and-pick technology of Microsoft Windows®. You create applications using a graphical knowledge tree, and our unique set of predefined objects automatically builds the bulk of your knowledge base. As you build and edit your application, LEVEL5 OBJECT automatically compiles into binary code.

As with all Information Builders products, LEVEL5 OBJECT is backed with expert technical support, training, and education.

To see how LEVEL5 OBJECT can help you develop knowledge-based PC applications faster and easier, call 1-800-444-4303.

LEVEL5™

INFORMATION BUILDERS, INC.
DEVELOPERS OF FOCUS, THE LEADING 4GL

800-444-4303

Microsoft Windows is a registered trademark of Microsoft Corporation.

SizeaBull

Four new UNIX systems make Bull's line longer and stronger than ever.

KNOW BULL

*UNIX is a registered trademark of AT&T. Oracle is a registered trademark of Oracle Corporation. Informix is a registered trademark of Informix Software, Inc. Uniplex is a registered trademark of Uniplex Integration Systems, Inc. Unify is a trademark of Unify Corporation. Copyright © Bull HN Information Systems Inc., 1990.

The DPX/2 Line

100 Family
200 Family
300 Family
500 Family

Featuring

Intel, Motorola and MIPS processing technologies

Bull Open Software environment; an enhancement of UNIX System V Major standards compliance (X-Open, IEEE, OSF, SVID)

Symmetrical multiprocessing

Open Architectures (AT, VME, Multibus II)

Outstanding capacity

- Connectivity to more than 500 users
- Storage to 40 Gigabytes
- Up to 576 MB Memory

Broad selection of industry solution products:

- RDBMS (Oracle, Informix, Unify)
- Telecommunications, Wide and Local Area (SNA, TCP/IP, OSI)
- Office (Uniplex)

Best price/performance of their class

One of the industry's best and broadest UNIX* lines is growing again.

Bull now provides unbeatable price/performance across a wide range of systems.

At the top end, Bull is introducing two of the most powerful multi-user systems based on Motorola's 68040 CISC and MIPS' R6000 RISC technologies. At the entry level the line has been extended with two new attractively-priced models.

Bull adds significant value through system level design and manufacturing; a wide variety of communication products; outstanding capacity; worldwide support, integration and services. Know Bull.

Learn more. Call 1-800-233-BULL x130 for a copy of the Bull DPX/2 Systems brochure.

Worldwide
Information
Systems

Bull

EDITORIAL

Market justice

Jazz. Next. PCjr. OS/2. Goldengate. Lisa. Rainbow. The Edsel.

So what do these (and other products too numerous to mention) all have in common? The answer is that they are all products backed by huge names and sometimes huger egos, products that in and of themselves were technically sound but either failed abysmally in the marketplace or severely underperformed against expectations and prodigious marketing hoopla.

They failed or underperformed for all the right reasons — their technical merits notwithstanding — because the most striking common feature of the items on this list is the lack of consideration of the customers and their needs. Next is thrashing about in a dry software lake (pretty hard to solve business problems without software). The Rainbow tried to tough it out as a maverick in a world of customer-induced standards. OS/2 extracts huge sums of money from large-scale users and gives back comparatively little in return.

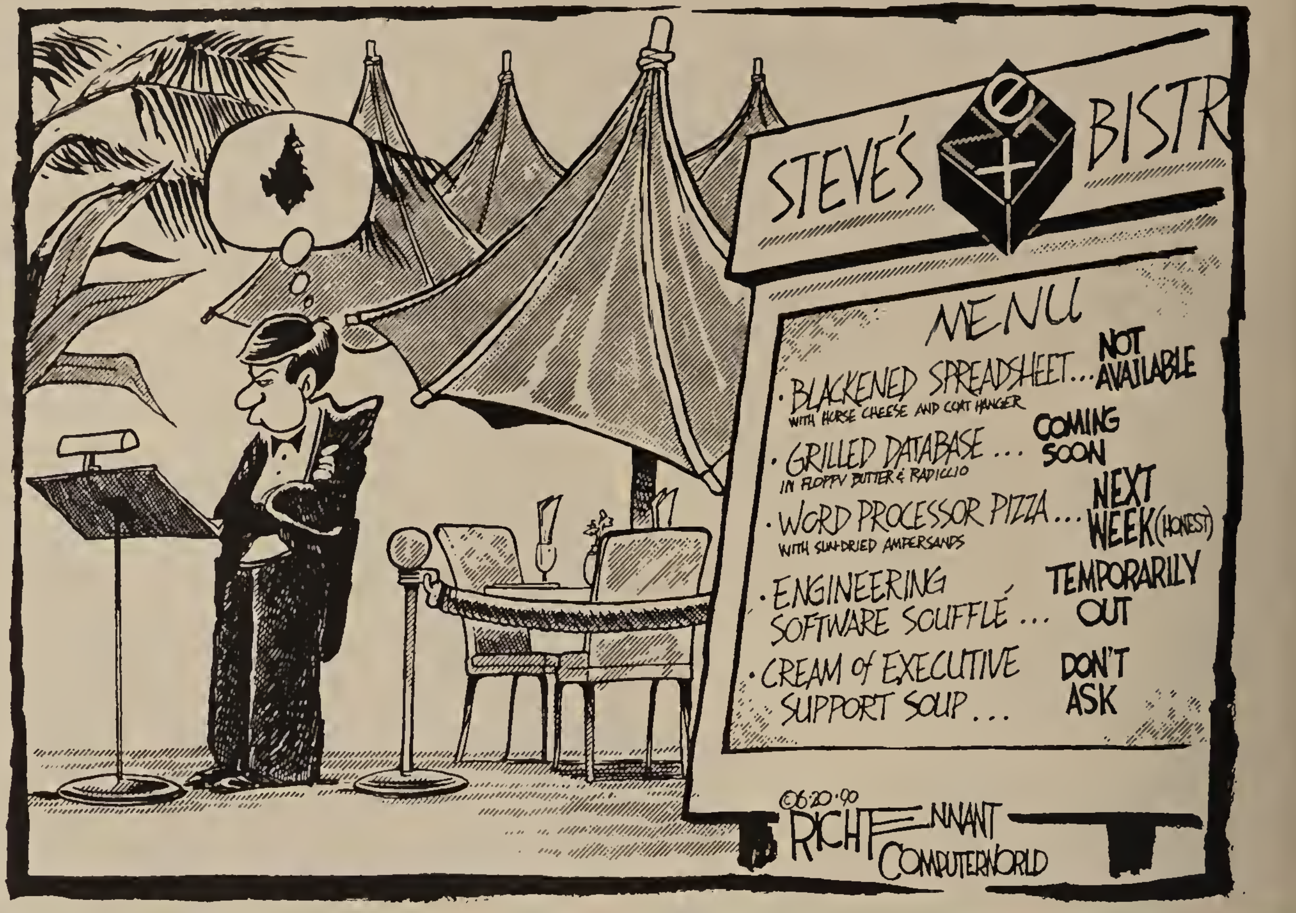
Conversely, consider the products that have achieved four-star status in the hearts and minds of customers — products such as the Macintosh, MS-DOS, IBM PC, the VAX series. Each product was designed with the customer in mind *a priori,* and this thought was made manifest in the business solutions each product offered.

In an environment in which product life cycles are measurable in months and the gap between hardware technology and software potential is measured in years, it's refreshing to note that the sophistication of the customer is staying ahead of the hype and promises. Like an informed electorate is to the political boss, today's customer becomes the worst nightmare for some companies and the people who run them.

Editor's note: Each year, four times per year, we survey a large sample of our readers as one way of understanding their needs and our ability to meet them more fully. There is one need that has remained constant in the 13 years these studies have been done — a need that has consistently ranked in the top three reader requirements overall. That need is for comparative product information and data on new technologies. Such findings compelled us to launch the monthly Buyers' Scorecard earlier this year.

Today we initiate a new monthly feature — namely, a series of software benchmarks of key large systems products (see story page 32). We will focus on fourth-generation language and computer-aided software engineering tools for the next several months.

The benchmarks are carried out at the vendor's site over a three-day period, overseen and carefully analyzed by *Computerworld's* independent team of consultants, who prescribe the specific programming task to be completed. With these benchmarks, we hope to add that much more perspective to your purchasing decisions in a world dominated by so many choices.


STEVE'S
BISTR
MENU
· BLACKENED SPREADSHEET... NOT AVAILABLE
WITH HORSE CHEESE AND COAT HANGER
· GRILLED DATABASE ... COMING SOON
IN FLOPPY BUTTER & RADICCIO
· WORD PROCESSOR PIZZA ... NEXT WEEK (HONEST)
WITH SUN-DRIED AMPERSANDS
· ENGINEERING SOFTWARE SOUFFLÉ ... TEMPORARILY OUT
· CREAM of EXECUTIVE SUPPORT SOUP ... DON'T ASK
©6·20·90
RICH TENNANT
COMPUTERWORLD

LETTERS TO THE EDITOR

Not a crook

I hope Michael Alexander feels better now that he's pilloried Robert Morris and placed him in the ranks of common thieves in "Justice failed in refusing to make Morris an example" [CW, May 14]. The Morris case merits the coverage and concern expressed in *Computerworld,* yet Morris — a serious, albeit seriously misguided, computer scientist — is not the proper candidate for symbolic condemnation.

To make an example of a foolish and immature "hacker" does nothing to address the real problem of the sophisticated criminal mind and the relatively easy access to business, research and defense systems.

The scales of justice weigh motive with action, and Morris' motive was not criminal. The sentence of community service and a fine is appropriate in kind, if light in measure.

Alexander does no justice to Morris or the information systems community at large to compare his actions to the 12-year-old thief who broke into a TRW computer. Alexander's opening analogy of the trespassing bicycle thief is amusing and ostensibly apt, but Morris trespassed with his own bicycle; he is simply not a thief.

David Julian Gray
Oakland, Calif.

Far from it

Your article "Taking the 'place' out of workplace" [CW, May 14] characterizes IS managers as "far ahead of their peers in other departments." My experience with managing a telecommuting group of systems software developers and supporters over the past two years hardly bears this out.

In the systems software business, there is considerable resistance to telecommuters, apparently based on little or no direct experience. I have talked to officers and directors of many firms, and the negative reaction to telecommuting is nearly unanimous.

Many firms are still trying to distance themselves from their often thinly capitalized beginnings. They now proudly display row upon row of programmers, lined up like 3380s in a computer room. They highlight the energy, creativity and work ethic of their staff. But they prefer to see them periodically gathered around a coffee pot, not industriously pursuing their duties at a remote location.

The economics and flexibility of telecommuting are easy to explain but getting an opportunity to prove them is another story. I'm so frustrated about this that I have an aversion to the word telecommuting. It implies that the remote employee belongs someplace else. With good management, the remote employee belongs where he is, so my word of choice is decentralized.

Arnold B. Krueger
Grosse Pointe Woods, Mich.

Get good people

It was sad to read your article "Systems developers frustrated" [CW, May 14] and notice that the problems mentioned (line managers unwilling to assign qualified users to project teams and systems development viewed as technology- rather than business-oriented) exist in all industries.

In fact, it seems that not only do they exist in all industries but also that they have existed for a long, long time.

I consider the most effective way to overcome these problems very simple: Hire good systems analysts. Unfortunately, most systems analysts are either ex-superprogrammers or ex-superusers.

In the 1970s, systems analysts were very technical, and all came from programming. Then somebody noticed the problem, but in a typical reactive fashion, an extreme solution was tried. So, in the '80s, we saw the emergence of users who started filling systems analyst positions mainly because they knew the latest computer jargon.

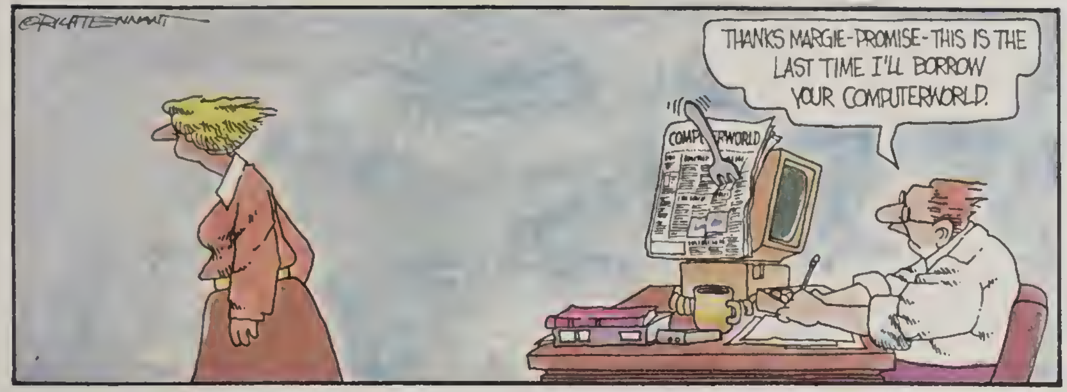
Let's hope that with the help of universities and information systems managers, we can avoid having such problems in the '90s.

Universities can help by offering more systems analysis courses or — even better — offer degrees in systems analysis separate from the traditional computer science degree.

IS managers can help by understanding that it is more important for systems analysts to have the right people skills, business sense, willingness to listen and ability to learn than to program well or to be familiar with the latest computer buzzwords.

Kamran Ashraf
Principal
Ashraf & Moy
Consulting Group
Irvine, Calif.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax: (508) 875-8931; MCI Mail: COMPUTERWORLD.*


THANKS MARGIE-PROMISE-THIS IS THE LAST TIME I'LL BORROW YOUR COMPUTERWORLD.
COMPUTERWORLD

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

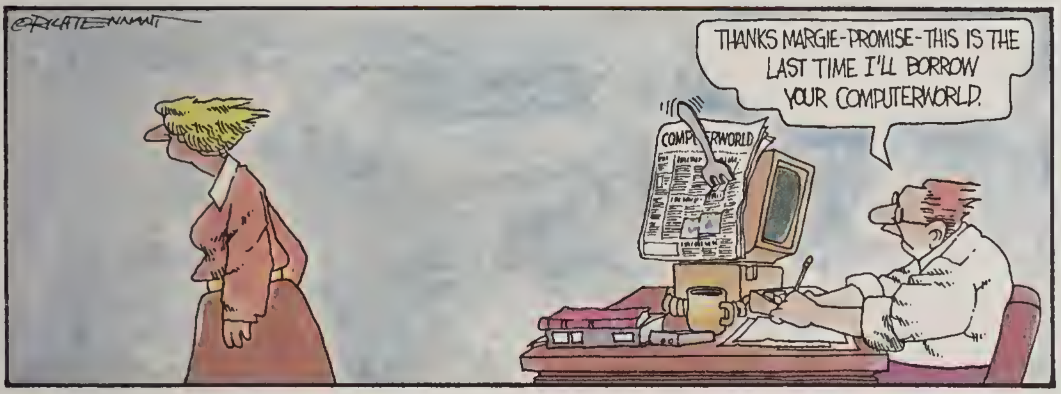
COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - **10.** Manufacturer (other than computer)
   - **20.** Finance/Insurance/Real Estate
   - **30.** Medicine/Law/Education
   - **40.** Wholesale/Retail/Trade
   - **50.** Business Service (except DP)
   - **60.** Government - State/Federal/Local
   - **65.** Communications Systems/Public Utilities/Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - **90.** Computer/Peripheral Dealer/Distr./Retailer
   - **75.** User: Other ______
   - **95.** Vendor: Other ______ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   - **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - **21.** Dir./Mgr. MIS Services, Information Center
   - **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
   - **23.** Dir./Mgr. Sys. Development, Sys. Architecture
   - **31.** Mgrs., Suprv. of Programming, Software Dev.
   - **32.** Programmers, Software Developers
   - **60.** Sys. Integrators/VARs/Consulting Mgt

   OTHER COMPANY MANAGEMENT
   - **11.** President, Owner/Partner, General Mgr.
   - **12.** Vice President, Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales & Mktg. Management

   OTHER PROFESSIONALS
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educator, Journalists, Librarians, Students
   - **90.** Others ______ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Local Area Networks
   - F. No Computer Involvement

E4026-9


THANKS MARGIE-PROMISE-THIS IS THE LAST TIME I'LL BORROW YOUR COMPUTERWORLD.
COMPUTERWORLD

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - **10.** Manufacturer (other than computer)
   - **20.** Finance/Insurance/Real Estate
   - **30.** Medicine/Law/Education
   - **40.** Wholesale/Retail/Trade
   - **50.** Business Service (except DP)
   - **60.** Government - State/Federal/Local
   - **65.** Communications Systems/Public Utilities/Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - **90.** Computer/Peripheral Dealer/Distr./Retailer
   - **75.** User: Other ______
   - **95.** Vendor: Other ______ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   - **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - **21.** Dir./Mgr. MIS Services, Information Center
   - **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
   - **23.** Dir./Mgr. Sys. Development, Sys. Architecture
   - **31.** Mgrs., Suprv. of Programming, Software Dev.
   - **32.** Programmers, Software Developers
   - **60.** Sys. Integrators/VARs/Consulting Mgt

   OTHER COMPANY MANAGEMENT
   - **11.** President, Owner/Partner, General Mgr.
   - **12.** Vice President, Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales & Mktg. Management

   OTHER PROFESSIONALS
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educator, Journalists, Librarians, Students
   - **90.** Others ______ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Local Area Networks
   - F. No Computer Involvement

E4026-9

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

The case against discounting

THOMAS DONOVAN

The widespread discounting that has been offered to users by both computer and communications manufacturers is not only continuing but appears to be accelerating.

During most of 1989, discounts in the 30% range were quite common for large users. Toward the end of 1989, 40% discounts were not unusual, especially for large mainframe computers. Deals that are being negotiated this year can range from discounts of 30% to 40% — and up to 50% for some manufacturers. Discounts are also not limited to mainframes; they can be found in minicomputers, micros and a wide range of peripherals.

The key question is: What is the legality of all this discounting?

In 1936, Congress passed the Robinson-Patman Act to deal with monopolies and business combinations that were acting in restraint of trade. Specifically, Robinson-Patman was enacted to curb and prohibit large buyers from gaining discriminatory preferences over smaller buyers by virtue of their greater purchasing power.

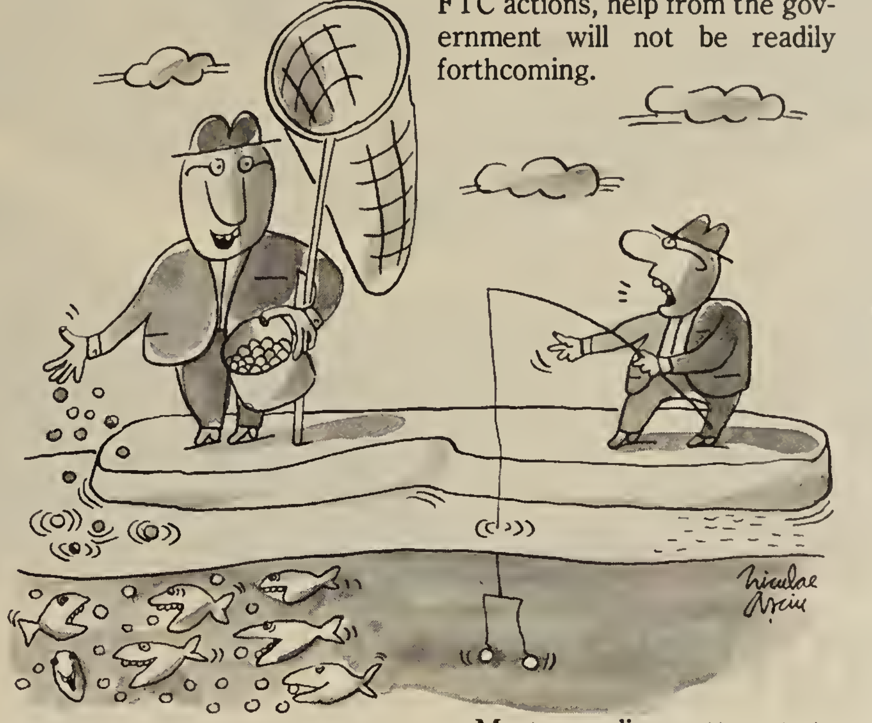
Are discounts of 40% or more legal? Probably not. It is difficult to see how a manufacturer can justify such a large spread in discounting computer equipment where, in many cases, the volume is delivered over a period of time and units are delivered on demand.

Blase attitude

Who cares? Apparently no one. The Federal Trade Commission (FTC) has been charged with the enforcement of the Robinson-Patman Act and antitrust laws in general. Because the federal government, under the current and former Republican administrations, has had a "hands-off" policy toward business activity, very little action has been taken by the FTC.

Private lawsuits are permissible, but such cases tend to be complex, time-consuming and expensive. Once the plaintiff presents some evidence of a violation, the burden of proof shifts to the defendant to prove that a violation did not occur. However, the damages sustained as a result of such a violation are difficult to quantify, and the plaintiff must present proof that it was actually injured as a result of the violation.

IBM would be the computer company most susceptible to a charge of violating Robinson-Patman by the FTC, based solely on its size. However, from a political point of view, it would be unusual to see the FTC institute an investigation that would result in helping such companies as Amdahl, owned 49% by Fujitsu, or Hitachi Data Systems, owned 80% by Hitachi.



As these and other international competitors enter the market and grow in market share, one could assume the possibility of charges of unfair competition by the FTC, based on deep discounting and accusations of dumping products below cost. However, considering past FTC actions, help from the government will not be readily forthcoming.

Most suppliers attempt to live within the spirit of fairness promoted by the act. Thus, discounts, market-basket incentives and other inducements offered by a supplier, they believe, must be equitably allocated among customers.

The key in negotiations is for the user to have an understanding of an exception to the general premise of Robinson-Patman. That exception is found in Section 13 of the act and allows, as a defense against a lawsuit, evidence from the supplier that the discriminatory price or the furnishing of extra services was made in good faith in order to meet an equally low price from a competitor. Since the competition's exact offer is not known, the mere presence of a competitor is sufficient to allow for wide price disparity among a vendor's customers.

Unfortunately, the loyal user who shuns competitive proposals and sources solely from one supplier cannot, under the law, get the best deal. On the other hand, the user who treats every acquisition in a competitive environment will, in most cases, receive a lower price or added benefits than he would have received otherwise.

Most users do not spend sufficient time either in negotiating volume contracts or in making a single unit acquisition. They rush into agreements and give up benefits that they might have been entitled to.

I have seen instances in which upper management has waited until the last minute to authorize a procurement and then put pressure on negotiators to get a deal done in the mistaken objective of efficiency. In those circumstances, it becomes easy for the negotiator to give in, give up and sign the contract in order to please his own management.

Donovan is the director of financial strategies at Technology Investment Strategies Corp., an IDG company.

Technopolis springs up in Japan's countryside

CHARLES LECHT

This story is set in one of Japan's most beautiful locations, the Kumamoto prefecture on Kyushu, the southernmost island of Japan. Kumamoto is one of the oldest cities in Japan. It is approximately 900 kilometers southwest of Tokyo. You wouldn't expect much more than farming and livestock production to be its only industries, but that's hardly the case. For several years now, Kumamoto prefecture has been home to major manufacturing facilities in Japan's electronics industry, including many making silicon chips.

To encourage industrialization in the Kumamoto area, the local and national governments have provided cheap land and tax incentives to foreign as well as Japanese companies who locate facilities there. In a specific drive to obtain software companies, the prefecture has offered its cities and towns up to 50% of the cost of building facilities. This was done because of the unique labor shortage of software people in Japan, particularly in its rural countryside. Kumamoto has set about to create seemingly instant cultural centers and to improve its schools in order to attract highbrow computer nerds who may equate big city life with cultural opportunity.

Kyushu is now called "silicon island," and according to the Ministry of Trade and Industry, integrated circuit production on Kyushu accounts for half a billion chips per month (40% of Japan's production and 30% of its total sales).

Not content to remain a hidden mecca for technology companies, the Kumamoto prefectural government set about to get known all over Japan and abroad as a great place to live and work. It managed to become the site of a Japanese government-authorized city dedicated to scientific research — the Kumamoto Technopolis, a $35 million project funded by government, industry and local citizens.

Technopolis is one of 26 cities in Japan whose reason for being is to foster a climate for scientific research and development.

After my recent visit to Technopolis, I came away convinced that, like a bamboo shoot, it is growing and will continue to grow faster than Westerners can imagine. When I visited the area a few years ago, there were few buildings visible. Today, the city has a dozen buildings and a cooperative university research center. Its original land is entirely spoken for, and plans for expansion are under way. Ultimately, the plan is for Technopolis to cover 100 square kilometers and encompass two preexisting cities, 12 towns and several villages.

Driving to Technopolis from just about any direction involves a peaceful transition of scenery from countryside into a modern metropolis. Once on the grounds, a neatly arranged group of widely spaced modern buildings partially hidden by vegetation sets the scene.

There is the Kumamoto Technopolis Center, which is a showplace for international forums on technology. It has an exhibit area that displays recent innovations in technology to the general public. The center also offers on-line database facilities to visitors and students/researchers who work in an adjoining facility called the Applied Research Electronics Center.

The Applied Research Electronics Center is a kind of university with an objective to upgrade local industrial competence in the areas of automation, computers and data processing technologies. It is subsidized by the prefecture so that those companies wishing to avail themselves of its resources may do so at reduced fees.

TECHNOPOLIS IS one of 26 cities in Japan whose reason for being is to foster a climate for scientific research and development.

Adjoining the Technopolis Center is the Kumamoto University Cooperative Research Center. This is where advanced research takes place. The three centers cover roughly 10% of the available space in Technopolis and constitute an impressive reflection of the prefecture's determination to make it more than a mere land development promotional stunt to attract industry.

The space is occupied by such technology-rich companies as NTT, NTT Data Systems Co., NEC, Matsushita and Fujitsu.

The governor of Kumamoto, Morihiro Hosokawa, speaks with the conviction of an evangelist about why his science city site is preferable to all the others. He preaches about the fresh air, lush green environment, plenty of space, good schools and modern roads.

In fact, Hosokawa is so convinced about the desirability of living in Kumamoto that he has instituted something he calls his "U Turn" program for people who have left the prefecture, had their taste of the fast life in such places as Tokyo and Osaka and now may desire to return.

According to the governor, to date, almost 5,000 people have visited the offices, about 10% have actually returned, and 1,500 are awaiting placement. High-tech applicants are especially welcome.

The Technopolis project offers us ample evidence of the mythological nature of a lack of creativity in Japan. It also offers strong evidence of what may be done when private citizens, educational institutions and government stop bickering and get on with improving their situation.

Lecht is an IDG News Service correspondent based in Tokyo.

The promise of AD/Cycle has just arrived three years ahead of schedule.

Why wait? Software AG's integrated CASE environment puts the promise of AD/Cycle to work for you now. While ensuring compatibility with emerging AD/Cycle technologies in the future.

Based on NATURAL, the world-class development technology, Software AG's CASE environment provides a modular, building-block approach to CASE implementation. So you can design, build and maintain a variety of applications—including knowledge-based systems—at your own pace. With the database you have now. No matter if it's DB2, VSAM, IMS, DL/1, SQL/DS or ADABAS on an IBM platform. Or RMS, Rdb or ADABAS on Digital's VAX.

The Software AG CASE environment covers all aspects of the application's life cycle—with analysis and design tools, code generation capabilities, repository-based management and integrated testing functions. All designed to work together. Now. The resulting applications are available through a consistent, easy-to-learn interface—with friendly features like active help, pull-down menus, windows and color graphics—that gives end users the information they want, the way they want it.

The integrated CASE environment from Software AG. Because tomorrow's promises can't solve your problems today. For more information, call 1-800-843-9534. (In Virginia, call 703-860-5050; in Canada, call 519-622-0889.)

Your success is how we measure ours.

SOFTWARE AG

© Copyright 1990, Software AG. NATURAL is a trademark of Software AG. *VAX, RMS and Rdb are trademarks of Digital Equipment Corporation.
ADABAS is a registered trademark of Software AG. IBM, DB2, IMS, VSAM, SQL/DS are trademarks of the International Business Machines Corporation.

COMMENTARY

Gary H. Anthes

Remember the software

Whenever the subject of computer performance comes up, someone is sure to refer to MIPS as "meaningless information promoted by salesmen," or some variation on that theme.

But if MIPS (millions of instructions per second) are meaningless, why is the measure so often used? Is it nothing more than marketing hype? MIPS and its scientific cousin MFLOPS (millions of floating-point operations per second) do offer useful ways of looking at performance. If they are used with care and in conjunction with other measures, they can give important clues about the work one can expect out of a computer.

One problem with the use of MIPS and MFLOPS is that they are often thought of as intrinsic qualities of a processor, like clock speed (usually expressed in megahertz) or its inverse, cycle time (nanoseconds). Often overlooked is the contribution to computer performance made by software — algorithms, compilers and, to a lesser extent, operating systems.

"A Japanese supercomputer has for the first time taken the title of the world's fastest single-processor computer," trumpeted *The New York Times* last month. It seems that the Hitachi S-820/80 had risen to the top of the charts — the much-watched Linpack benchmark ratings published every few

Continued on page 36

Portrait of DEC users, East to West Coast

BY MARYFRAN JOHNSON
CW STAFF

They want laptop minicomputers and voice-activated technologies.

Their biggest gripes center on data integrity and security procedures.

And they feel that industry standards are more important than vendor standards when buying computer hardware.

Sound like a bunch of Digital Equipment Corp. users? That is how they came across in the second Digital Equipment Computer Users Society (DECUS) Computer Industry Trends Survey, conducted last month at a DEC users convention in New Orleans. Of 660 surveys distributed, 10%, or 66, were returned.

"One finding that startled me was how people were using personal computers on their desks, and how it differed from East Coast to West Coast," said Art McClinton, a lead scientist at The Mitre Corp. in McLean, Va., and designer of the survey.

The West Coast users were nearly all avid PC users — Apple Computer, Inc. Macintoshes being particularly popular at VAX sites — while their Eastern brethren either used PCs six to eight hours a day or hardly at all.

The only other significant difference in the survey findings was the greater importance the East Coast crowd placed on centralized data processing. That may indicate a higher percentage of "traditional-type companies" present at the New Orleans meeting, McClinton said.

What was not surprising, McClinton said, was that nearly all the DEC users work in multivendor shops these days. More than two-thirds of those surveyed also spoke out for industry standards. "A lot of people are saying they want standards, because they think that's going to lead to applications portability," McClinton said. He went on to say that users may still be addicts for DEC's VAX proprietary hardware, "but they are a lot more industry-standard-oriented when it comes to software."

The DEC users pegged data integrity as more important than communications security but agreed that both areas "need significant improvement."

On money questions, the majority of the DEC users surveyed said that information technology budgets were rising faster than inflation at their companies.

"Doesn't sound like computers are saving people a lot of money, does it?" joked Jim Wellborn, outgoing chairman of the DECUS management council.

Yet Wellborn, director of administrative services at Crowe, Chizek and Co., an accounting firm in South Bend, Ind., said he sees a serious benefit to the survey — even with its limited number of respondents.

"The survey tells DECUS attendees a little something about the future, and it also backs them up when they go to upper management and say, 'Look, what we're doing isn't only us. Everybody is going in this direction!' "

FEATURE: SYSTEM MANAGED STORAGE

IBM's storage strategy: Playing to mixed reviews

BY BARBARA BOCHENSKI
SPECIAL TO CW

Resource-intensive and tedious, storage management has been a chore for most information systems shops. But approaches such as IBM's system managed storage (SMS) are trying to put a little magic into the storage management concept.

The promise of SMS is the complete automation of storage management. Logical data sets will automatically be placed in the most appropriate storage media — whether it is a direct access storage device (DASD), tape or main memory — depending on their importance and frequency of use. In this way, IS shops can make better use of storage units and reduce costs.

Joseph Gast

But has IBM's SMS strategy lived up to its promise? Users and consultants offer a mixed response.

With storage demand reaching crisis levels at some companies, managing the process well has become critical. "Our DASD growth has been between 30% and 50% a year," says Rick vonHeydenreich, vice-president of The Capital Group, Inc., a money management firm in Los Angeles. "We have limited physical space. The combination of SMS and IBM 3390 [disk drives] saved us a tremendous amount of floor space."

IS managers tout other savings from using SMS.

"Because SMS will manage the placement of your data, that will free up a fairly high-priced performance analyst," says Glenn Kloss, director of systems and operations at Bear Creek Corp. in Bedford, Ore., a company specializing in sending gifts of fruits and sweets worldwide. Bear Creek plans to use SMS to handle its 90G bytes of data.

Continued on page 34

BIM Spotlight

Remote Printing at Low Cost!!!

BIMSPOOL

BIMSPOOL retrieves print output from the **DOS/VSE POWER** spooling queue and prints it on a local or remote 3270 terminal printer via CICS. This provides RJE printing without its expensive equipment cost. (Often the 3270 printers are already in place, and lightly used.)

CRT functions are provided to display queues, manage print tasks, and to view output listings instead of or prior to printing.

Hundreds of users worldwide, since 1979. **BIM** 'wrote the book' on spooling to terminal printers from POWER queues.

Optional **laser printer** support feature available also.

Call for full documentation or **free 30 day trial.**

Price: $4000, $2000/yr, or $200/mo. BIMSPOOL is also included in several BIM product group offerings.

BIM has 15 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.

BIM® B I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436

612-933-2885
Fax 612-933-7764
Member Independent Computer Consultants Assn

CONFIDENCE.

You can be confident of the Sterling Software mark—it's a sure sign of quality systems software products and support. Reliable, easy-to-use products that have gained the confidence of most of the Fortune 500, with more than 32,000 product installations worldwide.

We back our products with the resources and commitment required to help you achieve the productivity your business needs today. And to give you confidence in the future.

For more information, contact Sterling Software.

STERLING SOFTWARE

THE FUTURE IS STERLING.

System Software Group Headquarters, 21050 Vanowen Street, Canoga Park, CA 91304, Phone (818) 716-1616.

Answer Systems Division: (818) 716-1616 Dylakor Division: (818) 718-8877 International Division: (818) 716-1616
Software Labs Division: (714) 889-2663 Systems Software Marketing Division: (916) 635-5535
Zanthe Systems Division: (613) 727-1397

Georgia-Pacific chops down IS

Lumber product firm whittled down mainframe and made it a network

ON SITE

BY MARYFRAN JOHNSON
CW STAFF

ATLANTA — When Paul Pavloff stepped into the top computer management job at Georgia-Pacific Corp., the place was crawling with consultants and stuck with an aging mainframe data center operation.

"IBM had us right where they wanted us," said Pavloff, senior director of information resources at the $9.5 billion pulp, paper and building products company. "Every two years, we were buying a new mainframe."

Not anymore.

Within a few months of joining Georgia-Pacific in 1986, Pavloff sent 60 consultants packing and launched an extensive project to downsize from an IBM 3081 to what eventually became a network of IBM Application System/400 machines managing the building products division and corporate headquarters.

Computer dualism

Today, the company plays a strange dual role for IBM. It serves as both a showcase for successful downsizing and a maverick source of information on unforeseen uses for the AS/400.

A case in point is Georgia-Pacific's unusual use of an IBM Token-Ring local-area network. Installed last January, the 4M bit/sec. ring links all of the AS/400s and other corporate computers on what Pavloff calls a "logical mainframe."

The term refers to the user-transparent nature of the Token-Ring network backbone, which connects all headquarters, distribution and manufacturing computer systems in a peer-to-peer network.

"We've eliminated the need for a mainframe, and that's got to trouble IBM," Pavloff said. "Even with companies moving to distributed systems, IBM always had a mainframe in there."

Yet from Georgia-Pacific's point of view, this network truly is the computer.

The extensive Token-Ring encompasses 21 AS/400s, more than 150 IBM System/36 machines from the manufacturing plants, a handful of System/38s and about 180 IBM Personal System/2s and Compaq Computer Corp. personal computers. A few Digital Equipment Corp. VAXs on the manufacturing side also tap in via Ethernet.

"We look at computing differently than a bank or an insurance company. The computers are not driving us," Pavloff said. "I don't have any applications requiring an American Airlines-size reservation system."

The key concepts for Georgia-Pacific's information systems operation are to distribute the work and simplify wherever possible.

"We're offloading the mainframe and putting the software on a computer just the size to run it," Pavloff explained. "Then we put the computer on the network to allow interchange of data from each node."

Reducing the number of technical platforms the firm supports is a longer-term goal. "Being a multivendor shop adds to support costs," Pavloff pointed out, "and different platforms make it impossible to support a common application like payroll."

This issue is especially pressing now that Georgia-Pacific has merged with Norwalk, Conn.-based Great Northern Nekoosa Corp., a heavily stocked IBM shop. Now a $15 billion pulp and paper conglomerate and new member of the Fortune 500, the firms are just beginning to grapple with an integration plan for their disparate systems.

The downsizing project at Georgia-Pacific has already enabled the firm to eliminate a dozen database management staff members, scale back on operations and technical support and trim software development costs.

Programming is now done in the RPG language instead of Cobol, with most applications written in-house. "That's been another savings for us," said Rich Hollahan, chief architect of the network and former MVS system manager. "We have half our [10-person] technical staff writing system utilities that IBM or third parties would have provided in the past."

The headquarters accounting group, for example, now writes applications on remote PCs, then downloads and distributes them from an AS/400 acting as a network server.

Each AS/400 on the network has its own dedicated function. A few serve as network monitors, while others are marked for development work, administrative use, accounting, communications or inventory and sales.

The old 3081 mainframe — now just another node on the Token-Ring — runs transportation applications and provides a centralized database for the System/36s.

For its pulp and paper mills, Georgia-Pacific still relies on a network of DEC VAXs and older IBM midrange systems.

The firm's most innovative use of DEC equipment, however, is a highly centralized, windowed order entry and invoicing system based on 108 Vaxstation 3100s. Newly installed this year, the Sales Order Processing System moved the building products salespeople beyond handwritten sales orders and printed invoices.

Rob Nelson

Paul Pavloff *(front) and part of his IS management team (from left): Ralph Dunlap, Rick Hollahan, Bob Macintosh, Ted Gardner*

Database system is a real Gemstone

BY JEAN S. BOZMAN
CW STAFF

ALAMEDA, Calif. — Servio Corp. recently announced a new version of its 2-year-old Gemstone object-oriented database management system, adding new performance features and application development tools.

Gemstone, installed at 120 sites worldwide, is designed to store complex data types and allow users to design their own object-oriented database structures, according to Servio. "It is not going to displace RDBMSs," said Servio Chief Executive Officer Donal O'Shea, "but it is going to provide users with a way to store such complex data types as images, full-motion video, geographic maps and CAD/CAM drawings."

Servio is actively marketing the system to traditional relational database management system vendors and has already reached a marketing agreement with Sybase, Inc. in Emeryville, Calif.

Gemstone 2.0, due to ship in October, is roughly three times faster than the earlier version and provides new programming tools that support graphically oriented database design. The new version allows users to "draw" the basic schema design and provides new application development tools. "It's our first step toward providing a full visual programming environment," said Jacob Stein , a senior system architect at Servio.

Early users at Pacific Bell, where Gemstone 1.5 has been used for a year, said they feel Servio's object-oriented technology aids in network simulations. Tom Soon, a research scientist at Pacific Bell's San Ramon, Calif., laboratories, said the product is useful, even if it is still evolving. "The work we're doing here involves very complex relationships among the data types," Soon said. "Gemstone allows us to store large amounts of complex data more easily than if we tried to force that same data into tables used in relational database management systems."

Gemstone 2.0 will ship in October for Sun Microsystems, Inc. workstations, Digital Equipment Corp. VAX computers and Decstation systems running Ultrix. A version for IBM RISC System/6000 machines is scheduled for shipment in the fourth quarter.

The upgrade is free for users of Gemstone versions 1.0 and 1.5. New user prices for Gemstone start at $12,000 for a four-user license.

On a steep learning curve with DB2? Or have you resorted to a 3GL to get the functionality needed with DB2?

Then discover why the Gartner Group reports, "For new users, preliminary user input indicates that NOMAD/DB2 may provide the most 'friendly,' tightly coupled and integrated 4GL in relation to DB2."

Relational since 1975, NOMAD has consistently led DB2, providing full referential integrity, additional security and a host of features that extend the functionality of DB2.

NOMAD's integrated procedural and non-procedural language and interactive windowing environment boost application development productivity while simplifying data access.

Unlimited outer-join support, application generation tools, an integrated DSS, and a report writer that handles virtually any requirement let you tackle critical applications with ease.

Add NOMAD's cooperative processing options and support for static SQL for DB2 and you have a performance powerhouse under your control.

NOMAD power. Maximize your DB2 investment TODAY.

Call **1-800-441-MUST.**

NOMAD POWER

NOMAD is a registered trademark of U3S International Ltd.
Other product names are trademarks of their respective companies.

MUST SOFTWARE INTERNATIONAL

20,000 Net
We're Still Makin

THE LEADERS IN MULTIVENDOR CONNECTIVITY WIDEN THEIR LEAD.

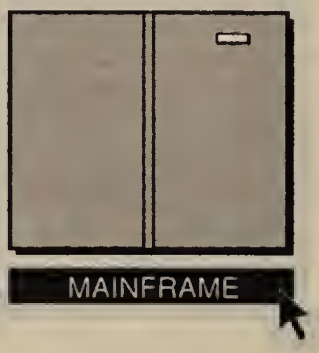
No one is more familiar with multivendor connectivity than the people at Businessland. After all, we've designed, installed, and supported more multivendor networks than anyone else.

And we're still breaking new ground—with a range of product offerings that give new meaning to the terms "host accessibility" and "connectivity." And we're doing it with a computer whose graphical user interface and integrated architecture make the host environment a lot easier to work with. Namely, the Apple® Macintosh.®

THERE ARE A HOST OF REASONS TO CONNECT WITH MACINTOSH.

Now there's an impressive suite of tools that lets you get more out of your investment in host applications.

Thanks to third-party software known as MitemView,™ your developers can quickly create a "point and click" interface for Macintosh-to-mainframe applications without making any host modifications.



And with a unique Mac-to-host software tool set known as MacWorkstation,® developers can create friendly front-ends to host applications that allow these applications to continue to evolve without modification of desktop software.

Not only does Macintosh connect into all environments, but Apple's Data Access Language makes it possible for your users to request and update information from host databases—regardless of what type of network technology, host system architecture, or DBMS they are using.

Another developer tool, MacAPPC,™ even allows the creation of Macintosh applications for cooperative processing in IBM's LU 6.2 SNA environments.

And with our newly formed alliance with KPMG Peat Marwick, Businessland can assist you in planning and developing exciting new

works Later,
g Network News.

custom applications using these products.

MACINTOSH CONNECTS TO THE BEST NETWORK SERVERS.

Another exciting development in Businessland's networking portfolio is the introduction of NetFRAME high-performance network servers, also known as "network mainframes."

NETFRAME

NetFRAME servers are considered to be the most powerful and reliable servers available today.* And they are particularly well suited for Macintosh—with a built-in Apple LocalTalk® connection as a standard feature.**

Not only that, NetFRAME servers support the most popular industry standard LAN operating systems, including NetWare 386 and OS/2 LAN Manager—as well as standard networking topologies like Token Ring and Ethernet.

THE BEST NETWORK SUPPORT FOR MACINTOSH.

In addition to providing all the hardware and software that is required to create a successful multivendor network, Businessland offers everything it takes to get that network working. Everything from consultation and installation to LAN administration training and support.

If you choose to set up a Gold Credit account with us, for example, your entire organization can have access to an extensive range of support services—including Solution Line Plus, our help desk and technical hotline.

GOLDCREDITS
BUSINESSLAND.
USA 85 1810 59 280021
J. DOE

IT ALL STARTS WITH A PHONE CALL.

To find out more about Macintosh connectivity and NetFRAME servers, and to receive a copy of a recent independent study conducted among MIS managers on the productivity benefits of Macintosh, contact us at 1-800-328-8383. Ask us to fill you in on all the network news.

BUSINESSLAND®
A Different Kind of Computer Company

© 1990, Businessland, Inc. Businessland and the Businessland logo are registered trademarks of Businessland, Inc. Apple, Macintosh, AppleTalk and LocalTalk are registered trademarks of Apple Computer, Inc. All other product names are trademarks or registered trademarks of their respective holders.

*PC WEEK, May 7, 1990. **Direct LocalTalk connections dependent on NetWare 386 NLM due Fall, 1990. Macintosh connection achieved today via standard bridges.

PRODUCT REVIEW

Development World Product Briefings

Software AG

Today, Computerworld *launches the first in a monthly series of performance benchmarks that for the next several months will focus on the integration of computer-aided software engineering (CASE) and fourth-generation language (4GL) products. The benchmarks are monitored by an independent team headed by David Whiteside, managing director of Computing Futures Ltd., and Prof. Eberhard Rudolph at the University of Auckland for exclusive publication in* Computerworld.

Each product is observed in action over a three-day period during which a vendor team solves the case study project costing system, an application familiar to most information systems professionals. The team's mission is to demonstrate the capability of the major CASE/4GL environments to deliver complete and complex business IS under "live fire" conditions. In this issue, we look at Natural from Software AG.

CASE DBMS 4GL

•

The three-person Software AG team implemented all functions required in the benchmark. Performance was marred by a bug in the external file-transfer utility, which corrupted the batch data and could not be resolved. Despite the bug, Software AG provided a robust solution. Thus, we awarded the product a "good" overall rating.

•

The team finished the benchmark in a total of 43 man-hours. Several estimating tools, suggested that the task would require at least 120 hours. On paper, this suggests a threefold improvement. In practice, however, some of this speed comes from the special situation of benchmark conditions, and therefore we regard their speed of development as "fair."

•

After completion of the benchmark, the team had to modify the system. This modification was a crucial test for the tools because the team had no previous knowledge of the nature of the change.

Software AG rejected a quick-fix option and provided a general solution requiring a fundamental change of the data structure. Despite this approach, the productivity in the maintenance phase was twice that of the initial development, a clear improvement meriting a rating of "good" on speed of maintenance.

•

During maintenance, the extensive documentation, including an impact analysis, came to the team's aid. However, the presentation was somewhat monotonous, and the graphics were very unattractive. Overall, we rated documentation "fair."

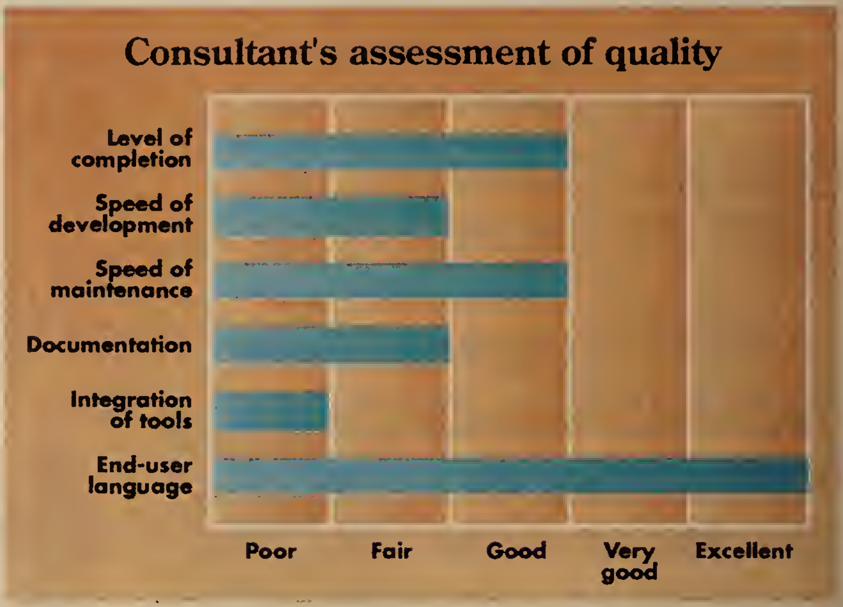
•

Time was lost combining tools and exploring interface details. The tools were interfaced at best and certainly not integrated. This is highlighted by the need for two separate data dictionaries, inviting confusion and opportunities for error. Team members with separate product skills were required for the CASE/4GL and application generator tools set. Different tools were needed for speed of development and for handling the complex parts of the case study. We rated integration "poor."

Software AG's tool kit

- Adabas – high-performance DBMS
- Natural – fourth-generation language
- Construct – Natural program generator
- Predict – data dictionary
- Predict Case – full life-cycle CASE tool
- Super Natural – decision support tool

Consultant's assessment of quality



•

The end-user tool Super Natural interfaced with the underlying database Adabas, providing a fast solution for the decision support section of the study. Within a half hour, the team produced a high-quality finished result, in some cases exceeding the requirements of the case study. We rated it "excellent."

•

In summary, we got the sort of sound solution with which we could live with — nothing dramatic, but a solid environment that gets the job done for a big shop.

Unfortunately, Software AG now has the problem of having to integrate a fashionable CASE tool with a proven software platform it cannot afford to throw away.

Staged Development and Maintenance

Performance in each area is graded from A (excellent) to F (failure).

ANALYSIS AND DESIGN: D
Software AG's CASE tool Predict Case was used to set up entities, data elements and attributes. Interestingly, the tool was not used to define business processes or logic.
Strength: Integrity assured for large multiterminal projects.
Weakness: Poor graphics.

DATABASE SETUP: B
The entity data model was downloaded to the Predict data dictionary with automatic generation of the physical database in the Adabas DBMS.
Strength: Because this comes directly from the CASE tool, setup is a pure formality.
Weakness: CASE definition can be bypassed, making integrity questionable.

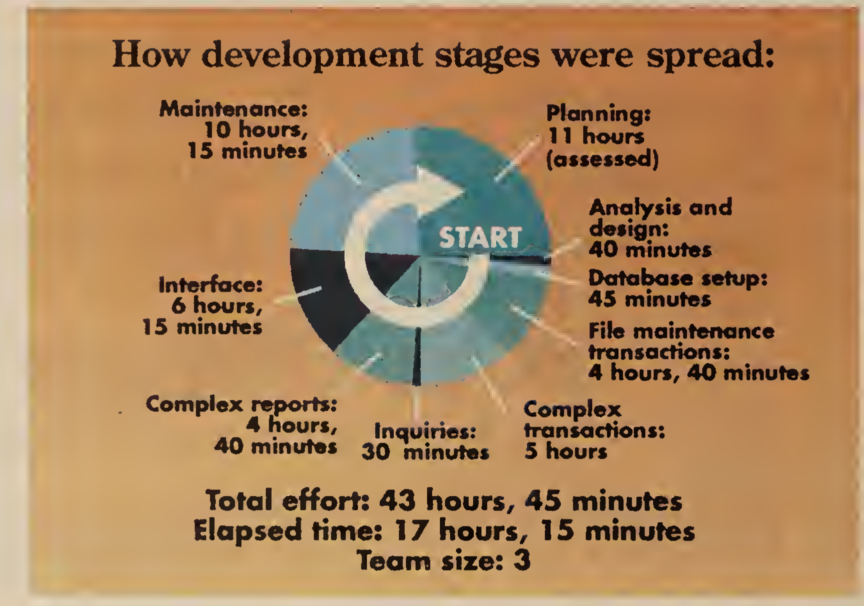
FILE MAINTENANCE TRANSACTIONS: B
The application generator Construct, in connection with its locally enhanced templates, provided 80% of the Natural 4GL code automatically.
Strength: Construct handled all processing logic.
Weakness: Standard templates had to be enhanced.

COMPLEX TRANSACTIONS: B
The Construct application generator was again used to correlate four files, updating two of them and providing referential integrity checks.
Strength: The code was easy to extend.
Weakness: Fundamental editing, such as referential integrity checks, was done at the program level rather than in the data definition.

INQUIRIES: A
Initially, the team developed the solutions with Construct. On request, the job was redone in Super Natural in one quarter the time.
Strength: Easy and fast in expert hands.
Weakness: A bit too technical for the end user, and screens were not well formatted.

COMPLEX REPORTS: C
Using the data definition from the Predict data dictionary, a Natural 4GL program was written by the team's Natural expert in conventional programming style. The program required a few changes to complete.
Strength: Natural can handle high levels of complexity.
Weakness: It lacks a sophisticated report generator.

How development stages were spread:



Total effort: 43 hours, 45 minutes
Elapsed time: 17 hours, 15 minutes
Team size: 3

INTERFACE: F
The standard Dbase import utility could not translate Dbase III files. The team wasted a lot of time analyzing the problem and writing a Natural program, which still produced intermittent errors.
Strength: The impact analysis report provided valuable guidance.
Weakness: It does not support some popular personal computer software.

ENHANCEMENT: B
The team was required to change the data structure of their solution. The modification was made at the highest level of the data structure in the CASE tools data dictionary. An impact analysis report was used to identify the areas in the original solution that required modification. One hour was lost because of confusion over multilayer default structures, which had changed between versions of Predict.
Strength: Impact analysis report provided valuable guidance.
Weakness: Modification of details at a high level was not always easy.

The solution was developed on an IBM 4381 A14 under MVS/XA using Complete and Net-Pass supporting 120 active users of which 50 were software developers. Natural Connection was used to communicate with IBM 3270 PC stations.

Details of the products are available from: **Software AG of North America, Inc.,** 11190 Sunrise Valley Drive, Reston, Va. 22091. 1-703-860-5050.

Development World *product briefings are based on a series of full solutions to the case study. They are prepared by leading vendors and published along with in-depth product analyses and consultants' test reports in Development World Libraries.*
Please see business reply card between pages 86 and 87 or FAX 1-508-820-0146 for a brochure.

BEG·BORROW·STEAL·SUBSCRIBE

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

Address Shown: ☐ Home ☐ Business

First Name ________ MI ________ Last Name ________

Title ________ Company ________

Address ________

City ________ State ________ Zip ________

Please answer questions to qualify for this rate.

1. BUSINESS/INDUSTRY (Circle one)

10. Manufacturer (other than computer)
20. Finance/Insurance/Real Estate
30. Medicine/Law/Education
40. Wholesale/Retail/Trade
50. Business Service (except DP)
60. Government - State/Federal/Local
65. Communications Systems/Public Utilities/Transportation
70. Mining/Construction/Petroleum/Refining/Agric.
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90. Computer/Peripheral Dealer/Distr./Retailer
75. User: Other ________
95. Vendor: Other ________
(Please specify)

2. TITLE/FUNCTION (Circle one)

IS/MIS/DP MANAGEMENT

19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
21. Dir./Mgr. MIS Services, Information Center
22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Suprv. of Programming, Software Dev.
32. Programmers, Software Developers
60. Sys. Integrators/VARs/Consulting Mgt.

OTHER COMPANY MANAGEMENT

11. President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
51. Sales & Mktg. Management

OTHER PROFESSIONALS

70. Medical, Legal, Accounting Mgt.
80. Educator, Journalists, Librarians, Students
90. Others ________
(Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant.

A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Local Area Networks
F. No Computer Involvement

Basic Rate: $48 per year. *U.S. Only

COMPUTERWORLD

E2026-8

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

New DisplayWrite 5. Get what you want, without giving up what you have.

New for DOS, DisplayWrite® 5 has what it takes to give users and buyers alike the power, speed and flexibility they've been asking for.

In fact, there are 35 new features. Like split-screen editing that lets you edit and share text between two documents at once. Next, there's Page Preview so you can see text in a WYSIWYG environment to make sure it looks its best before printing. There's even a new command line interface to bypass menus and streamline your work.

The new DisplayWrite also offers advanced merge options, multi-column formatting, support for a wide variety of fonts and more printer support than ever.

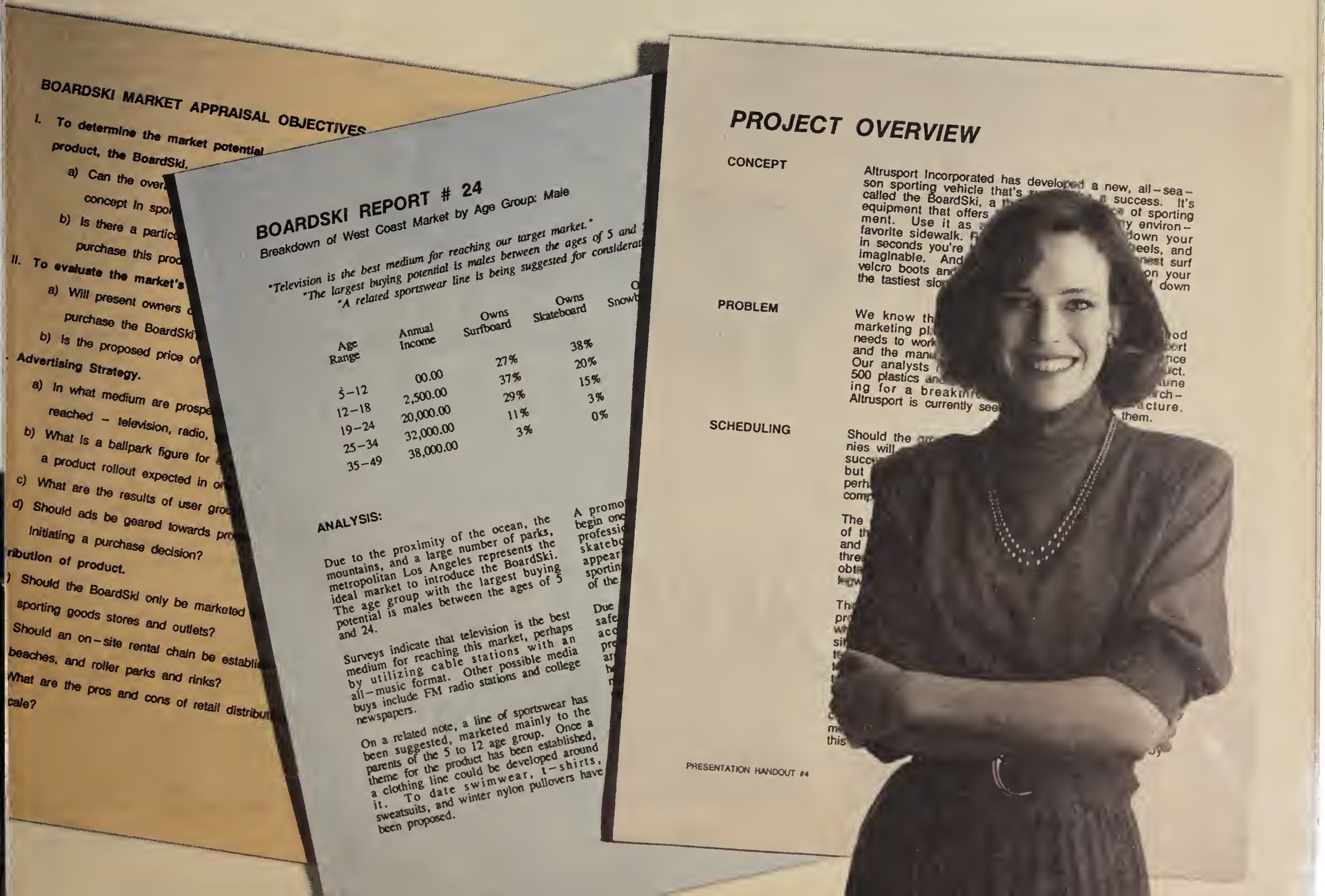
And since the new version is compatible with the entire DisplayWrite family, your company's current investment in software and training remains intact. The uncomplicated pulldown menus make it easy for experienced users to employ new features and for new users to learn, right from the start. If anyone has a question, a toll-free support line is there to help.

New DisplayWrite 5: with everything it has, you're bound to get exactly what you want.

Upgrade now. See DisplayWrite 5 at your local dealer or call 1 800 IBM-7699, ext. 218 for more information.

IBM and DisplayWrite are registered trademarks of International Business Machines Corporation © 1990 IBM Corp.

IBM



BOARDSKI MARKET APPRAISAL OBJECTIVES

I. To determine the market potential
product, the BoardSki.
a) Can the over
concept in spo
b) Is there a partic
purchase this proc
II. To evaluate the market's
a) Will present owners c
purchase the BoardSki
b) Is the proposed price of
Advertising Strategy.
a) In what medium are prospe
reached – television, radio,
b) What is a ballpark figure for
a product rollout expected in or
c) What are the results of user gro
d) Should ads be geared towards pro
initiating a purchase decision?
ribution of product.
) Should the BoardSki only be marketed
sporting goods stores and outlets?
Should an on-site rental chain be establi
beaches, and roller parks and rinks?
What are the pros and cons of retail distribu
cale?

BOARDSKI REPORT # 24

Breakdown of West Coast Market by Age Group: Male

"Television is the best medium for reaching our target market."
"The largest buying potential is males between the ages of 5 and
"A related sportswear line is being suggested for considerat

Age Range	Annual Income	Owns Surfboard	Owns Skateboard	O Snowb
5–12	00.00	27%	38%	
12–18	2,500.00	37%	20%	
19–24	20,000.00	29%	15%	
25–34	32,000.00	11%	3%	
35–49	38,000.00	3%	0%	

ANALYSIS:

Due to the proximity of the ocean, the mountains, and a large number of parks, metropolitan Los Angeles represents the ideal market to introduce the BoardSki. The age group with the largest buying potential is males between the ages of 5 and 24.

Surveys indicate that television is the best medium for reaching this market, perhaps by utilizing cable stations with an all-music format. Other possible media buys include FM radio stations and college newspapers.

On a related note, a line of sportswear has been suggested, marketed mainly to the parents of the 5 to 12 age group. Once a theme for the product has been established, a clothing line could be developed around it. To date swimwear, t-shirts, sweatsuits, and winter nylon pullovers have been proposed.

A promo
begin one
professio
skatebo
appear
sportin
of the

Due
safe
acc
pro
ar
h
n

PROJECT OVERVIEW

CONCEPT

Altrusport Incorporated has developed a new, all-sea-
son sporting vehicle that's
called the BoardSki, a
success. It's
equipment that offers
of sporting
ment. Use it as
y environ-
favorite sidewalk.
down your
in seconds you're
eels, and
imaginable. And
nest surf
velcro boots an
on your
the tastiest slo
down

PROBLEM

We know th
marketing pl
od
needs to work
ort
and the manu
nce
Our analysts
uct.
500 plastics and
une
ing for a breakth
rch-
Altrusport is currently see
cture.
them.

SCHEDULING

Should the
nies will
succ
but
perh
comp

The
of th
and
thre
obt
legw

Th
pr
wh
si

this

PRESENTATION HANDOUT #4

Storage

FROM PAGE 27

For vonHeydenreich, moving to SMS has meant that his systems administrator can now take on systems programming assignments.

SMS also alleviates the sticky problem of running out of space during a production job. SMS warns IS when a storage device reaches a specified threshold, enabling the shop to take corrective action instead of having the system bomb during a production run.

The user community wants the relief that a concept like SMS can provide. "At a recent Guide user group meeting," says John Petrella, senior DP manager at the Bank of Boston, "the audience was asked how many people currently have SMS in production. Only about 15 of 200 hands went up. But when they were then asked how many intend to begin SMS implementation in 1990, nearly all hands went up."

The Bank of Boston itself is in the midst of an SMS conversion project that has already netted an 18% savings in DASD space.

However, some users and analysts say that SMS is not as feature-rich and trouble-free as they had hoped.

The migration to SMS takes time, expertise, system capacity and planning, according to Dave Vellante, vice-president of peripheral market research at Framingham, Mass.-based International Data Corp. "SMS does not do some things today that customers need it to do, such as dynamically managing data sets and matching data sets on the right device," Vellante says.

Re-evaluate

To take advantage of SMS, which is available for IBM's ESA, MVS/XA and in a limited capacity for VM systems, IS installations will have to carefully re-evaluate how they are using data sets. Some sites will require a complete change of all data set names, which provide information about how the data is used, how critical it is and how frequently it is used so that SMS can determine what kind of device to store the data on.

To handle the rest of Bear Creek's data, Kloss says, "we will have to design data set naming conventions that correspond to SMS rules we establish for the access and performance of data. And that's a tremendous task."

For its part, IBM recommends using the data set name to communicate information about the data set to the system.

Kloss offers this advice: "There are certain groupings that SMS is going to want to put your data sets in. If you can structure your data set names in such a way that you can tell those groupings by just looking at the data set name, you'll be way ahead of the game."

Whole new ball game

SMS changes the way IS shops are used to managing storage. SMS provides new constructs and classifications such as storage groups (how the data relates to physical devices), data class (description of the data), storage class (storage characteristics required for the data) and management class (life-cycle management data).

An IS installation, through automatic class selection (ACS), controls the assignment of these classifications to each data set when it is allocated.

Writing ACS routines that perform accurately is critical to a successful SMS implementation, says Nick Allen, program director of the IBM large-system computer market at Gartner Group, Inc. in Stamford, Conn. If an ACS routine is written incorrectly, "The data sets will not be managed the way you think they will be — including going in the wrong places, being scratched too early, being on the wrong kind of device and not getting the response time you want," Allen warns.

Testing ACS routines adequately has been a controversy within SMS.

Claire Gillen, a storage management consultant at IBM, says that the Interactive Storage Management Facility enables testing of ACS routines to determine a number of factors: whether your logic is correct, whether you've tested for all the variables and whether you have selected

TRUER BLUE.

NO RISK SUPRA TRIAL.
SEE BLUE IN A WHOLE NEW LIGHT.

Cincom's SUPRA® High Performance SQL Relational DBMS is now SAA compliant in all VM and MVS environments as well as VSE. It also runs on VAX™ and UNIX.® Better yet, it's the most powerful DBMS around. Because applications built using SUPRA are DB2 compatible, you can implement relational systems today using SUPRA in your existing environment and run with DB2 later without conversion. So now you can go SAA without spending a blue million. Call today for more information.

SUPRA
High Performance Relational DBMS
800-543-3010/513-661-6000 Ohio/800-268-9279 Canada

CINCOM
The Most Experienced DBMS Company In The World

© 1990 Cincom Systems, Inc. VAX is a trademark of Digital Equipment Corporation. UNIX is a registered trademark of AT&T Corporation.

all of your storage groups, among other things.

Judy Johnson, manager of the storage management center at IBM's General Products Division, says that to deal with ACS testing, IBM offers users a starter set of ACS routines fitting a number of environments.

Hardware, anyone?

SMS software, like other IBM software areas, has further been hit by charges that it is a vehicle for IBM hardware sales.

Donald Egan, chief capacity planner at Provident Life and Accident Insurance Co., which is laying the groundwork for SMS, says IBM is hinting that to achieve dynamic tuning, users should put the data set on cache, which is supported on an IBM 3990 disk cotroller. "That's too expensive," Egan says.

Kloss shares his concern. "The 3990, in conjunction with SMS," Kloss says, "is the only hardware/software combination that will allow you to cache on a data set basis. Without that facility, you lose much of the performance aspects of SMS."

Johnson replies that IBM is merely taking advantage of the capabilities of its hardware.

Third-party follow-up

Such problems have enabled software vendors such as Sterling Software, Inc., Storage Technology Corp. and Legent Corp. to offer a variety of tools that either compete with IBM products or fill niches left by IBM.

"There are opportunities for third parties to add value to VSE and platforms like that," Allen says. "There are tremendous opportunities in the management of removable media — both tape and optical."

Sterling Software, for one, has introduced View, a PC-based color graphics interface. This user interface offers a menu-driven, point-and-shoot technology to the storage management environment that enables storage administrators to monitor the status of the environment. IBM does not offer a similar product.

According to John Brightly, technical services manager at American Tobacco in Chester, Va., and a Sterling user, the company is also working on its "Eagle" project, in which it will support multiple platforms, including multiple operating systems. When completed, the system will enable users to automatically back up PCs to mainframes and onto disks. It will also allow IS shops to back up Digital Equipment Corp. and Wang Laboratories, Inc. equipment, Brightly says.

SMS cannot function across multiple environments, Johnson acknowledges. But with SMS as IBM's focal point for enterprise storage management, she says, "we cannot bind ourselves to just IBM environments." She says IBM is currently working with OS/2, OS/400 and AIX environments as well as non-IBM environments for SMS.

For now, SMS helps make some sense out of storage. But is SMS all it can be? "If you say SMS' promise was to do competitive storage management, then yes, it lived up to that," Allen says. "But if you say the promise was to leap light-years ahead, no, I don't think that promise has been fulfilled." •

Bochenski, a 30-year veteran of the IS field, is a free-lance writer and advanced computing consultant in Bellevue, Wash.

Plugging the gaps

What does the future hold for SMS? IBM will most likely concentrate on filling holes in its strategy. "IBM is just getting into phase three of SMS, and that's where the most important elements are to manage active data on the fly," says Nick Allen, an analyst at Gartner Group, Inc.

The focus of SMS up to this point has been on-line storage, because that is where the big problem is for users, according to International Data Corp.'s Dave Vellante. IBM has not optimized SMS for secondary devices such as tape and optical disc.

"It shouldn't be a surprise to anybody that IBM is not going to spend a significant amount of money right now trying to overhaul and automate its secondary storage," Vellante says. "If IBM came out today and said, 'OK, we're going to spend $5 billion on SMS code to support optical storage and the object access method [which manages the objects stored in optical],' it would find 10 customers who could use it. That would be dumb on IBM's part. People aren't doing imaging in a big way right now."

Allen agrees: "IBM really has not stepped up to removable media at all, including optical — write-once or erasable or CD-ROM, for that matter. And while I expect IBM to announce an optical product within six to 18 months, that product will probably be purchased from a third party, and it will probably be write-once technology."

Other areas, such as shared direct-access storage devices, are a long way off, according to Allen.

BARBARA BOCHENSKI

"I HAVE TO FREE $750,000 FROM MY DATA CENTER BUDGET NOW..."

A USER'S CHALLENGE:

The director of computer operations at one of the nation's best-known on-line service companies had a serious problem last Fall. He had production-crippling paging problems, degrading response times on 1,000 3270 PCs, and a mandate to update five mainstream applications. He had enough budget to upgrade his System/3090 Model 200 to a 300E, but was still $750,000 short of his needs. His quick solution: STOR/9000 central and expanded memory from Cambex. He replaced and doubled original memory with Cambex STOR/9000 memory and had his answers: no paging problems; 3270s that fly; development going full blast. Once it's installed, users don't think about Cambex memory. They only think about the opportunities it gives them. Ask your Cambex sales representative for more information about this customer.

CAMBEX TO THE RESCUE.

Cambex gives you fast, invisible solutions to your System/3090 mainframe cost and productivity problems. Our STOR/9000 central and expanded storage systems are used in over 100 System/3090 data centers to free up budgets and throughput quickly, reliably and transparently. Install it, then forget it — that's the Cambex way. Sign up for *The Cambex Challenge* and find out why: we'll install one board for one week *free* so you can try before you buy.

Cambex

Cambex Corporation
360 Second Avenue
Waltham, MA 02154
617-890-6000
800-325-5565
Fax 617-890-2899
Telex 92-3336

HP to expand RISC market presence via Hitachi

BY J. A. SAVAGE
CW STAFF

Joining Sun Microsystems, Inc. and Mips Computer Systems, Inc. in their attempts to broaden the market reach of competitive reduced-instruction set computing (RISC) processors, Hewlett-Packard Co. recently licensed its second chip manufacturer. The deal will allow Hitachi Ltd. to market embedded and high-end processors at the component level.

With this agreement, Hitachi joins Samsung Electronics Co. as a manufacturer and marketer of HP's precision architecture RISC chips, although Samsung's agreement limits it to chip sets. Sun and Mips each have deals with several companies to manufacture and market their versions of RISC architecture.

This is HP's second agreement with Hitachi. Last July, HP made an agreement with Hitachi Computer Division to use HP RISC chips in high-end computers. Last week's five-year deal involved Hitachi's semiconductor division. Neither firm would state a value for the agreement.

Initially, Hitachi will market processors for embedded use, which the company sees as a fast growing market, according to Tony Moroyan, marketing and engineering director for Hitachi's semiconductor and integrated circuit division.

The two companies will develop software tools for the embedded market and will also develop mutual training and support, according to Lee Rhodes, HP technology transfer manager.

The high-end chips will be over 100 million instructions per second, Moroyan said, but neither the companies nor analysts expressed concern that they would clash in the workstation market.

"HP isn't selling many workstations as it is," said Vicki Brown, an analyst at International Data Corp. "The market is small and shrinking. It only lends the perception to users that they have a choice."

If you work for the same organization, you should work on the same network.

Even if your organization is scattered over a dozen different networks and sites, you can still share projects and ideas as in the good old days. But instead of working under one roof, you work together on one network–from Network Systems.

We make a family of high-performance routers that treat all networks as equals. You can connect almost everything from Ethernet® to FDDI to WANs. From PCs to mainframes to supercomputers. From this side of the building to the other side of the world.

That means you can pick systems and networks that fit the need without wondering if all the pieces fit together.

Call 1-800-338-0122. Network Systems routers make everyone in your organization as close as right across the hall.

Network Systems®

©1990 Network Systems Corporation.

Anthes

CONTINUED FROM PAGE 27

months by Jack Dongarra, a computer scientist at the University of Tennessee and Oak Ridge National Laboratory.

The Linpack test is a set of Fortran routines that more or less resemble the number crunching that goes on in many scientific and engineering applications. It measures computer speed in MFLOPS, and its top ratings have for years gone mostly to supercomputers from Cray Research.

Now Hitachi holds the top position for a uniprocessor machine, burning up the bytes at the rate of 107 MFLOPS. However, the S-820/80 is not a new machine. A threefold jump in performance from the previous rating of 36 MFLOPS is entirely because of improvements in its Fortran compiler — specifically in its ability to optimize code — according to Dongarra.

Similarly, the now-obsolete Cray-1 with a modern compiler posts a speed of 27 MFLOPS, 125% faster than the same machine running 1983-vintage software.

Computer makers are increasingly recognizing the importance of software in performance. Cray, which used to dismiss software as something customers should worry about, now devotes half its research and development budget to it. It was through software that the company made its multiprocessor Y-MP smart enough to get to the top of the Linpack chart, a feat requiring the efficient distribution of processing work load across eight CPUs.

> CRAY, WHICH USED to dismiss software as something customers should worry about, now devotes half its research and development budget to it.

However, smart compilers hold only part of the answer. Much can be done by tweaking algorithms. Victor Peterson, deputy director at the National Aeronautics and Space Administration's Ames Research Center, says he's seen computer performance at the center improve by five orders of magnitude — a factor of 100,000 — in 15 years. He attributes fully half that to better application code based on more efficient algorithms.

NASA has a plan to reach a teraflops — 1,000 GFLOPS — level of computing by the year 2000, and Peterson says he expects that better algorithms will continue to contribute half the performance improvements.

Most experts say the future of high-performance computing lies in parallel processing. If so, that's good news for the U.S., because efficient use of parallel processors requires very sophisticated software, one of the few areas in which we still enjoy a significant lead over every other country.

As a result, the Japanese may well retain the speed lead for single processors, while remaining behind in terms of having the fastest systems overall.

Anthes is *Computerworld's* Washington, D.C., correspondent.

HP X-Terminals let you add and subtract at the same time.

Everyone on your project needs access to the network. But there aren't enough workstations. Nor is there enough money in your budget for more.

Hewlett-Packard has a better way.

The HP X-Terminal Series. A full family of X Window Terminals that operate within any UNIX* environment. Yet are also very compatible with your budget.

HP provides the most flexible options available. For instance, you can start with our high performance 8-plane color or gray-scale X-Terminal. Then trade up to an HP workstation or next generation HP X-Terminals with our unique upgrade program.* Either way, you've made a secure investment with freedom to grow.

The best part, however, is that everyone who needs a station can now have one. HP X-Terminals start as low as $2995.**

So if you'd like to add to your project team—without subtracting much from your budget—call us for more information at 1-800-752-0900, Ext. 1265.

There is a better way.

HEWLETT PACKARD

---

*100% return credit on HP 700/X terminal when applied to upgrading to a color or monochrome HP workstation. **U.S. list price for monochrome HP 700/X terminal including 19" gray scale monitor with 1024 x 768 resolution, keyboard, mouse, 1 megabyte memory. UNIX is a registered trademark of AT&T in the U.S.A. and in other countries. © 1990 Hewlett-Packard Company CPEG924

NEW PRODUCTS—HARDWARE

Processors

Genroco, Inc. has begun shipping the Python/386, a coprocessor designed for Digital Equipment Corp. Q-bus-based systems.

The product enables users of DEC multiuser systems to run programs for IBM Personal Computers, such as Lotus Development Corp.'s 1-2-3 and Wordperfect Corp.'s Wordperfect, from standard DEC-compatible terminals. It is available with 4M or 16M bytes of random-access memory coupled to an Intel Corp. 80386-based CPU.

Pricing ranges from $8,000 to $10,000, depending on type of system and options.

Genroco
205 Kettle Moraine Drive North
Slinger, Wis. 53086
414-644-8700

Data storage

CFR Associates, Inc. has announced a 10G-byte, cassette tape subsystem that uses standard commercial VHS videocassettes.

The Megastor X can transfer data at sustained rates of more than 1M to 4M byte/sec. The product can access files in less than 90 seconds, and when coupled with a 50-, 280- or 600-cassette robotic jukebox, it can make a cassette change occur within 30 seconds, the vendor said.

The product is slated for release in the fourth quarter. A stand-alone subsystem costs $65,000, and the 50-, 280- and 600-cassette archivers begin at less than $40,000. VHS cassettes sell for $20 apiece.

CFR Associates
18 Granite St.
Haverhill, Mass. 01832
508-372-8536

I/O devices

NBS Southern, Inc. has announced a midrange laser printer that uses 6M bytes of on-board memory to support duplex printing.

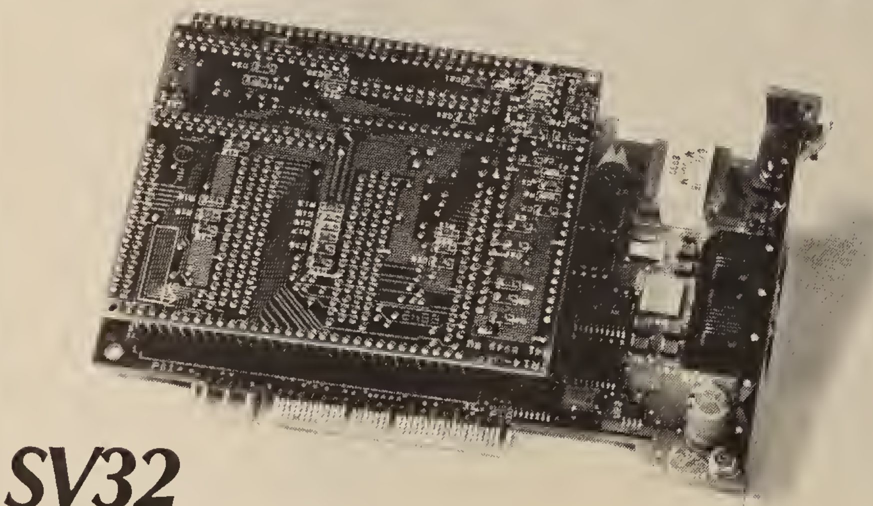
The NBS 3840D features 300 dot/in. resolution and includes 57 resident fonts. It can reportedly output 40 letter-size images per minute in simplex mode and 20 images per minute in duplex or duplex tumble modes.

The printer can be linked to IBM mainframe, System/36 or 38, Application System/400 or Personal Computer products. Interfaces are also available for Digital Equipment Corp. VAX systems and Ethernet networks.

A standard configuration of Model 3840D costs $54,950.

NBS
11451 S. Belcher Road
Largo, Fla. 34643
813-541-2200

SNA ENGINE



SV32
Integrated SDLC Adapter and CCITT V.32 Modem

Our SV32 integrated SDLC adapter and CCITT V.32 modem for IBM PS/2®s with Micro Channel™ Architecture is a real SNA engine. Designed to power very high speed communications applications, the SV32 can run all of IBM's SNA connectivity software under DOS and OS/2® Extended Edition. And communicate with remote SNA hosts at speeds up to 12,000 bps over dial-up phone lines.

So to get your PS/2s equipped for real communications performance, install our SV32 SNA engine today and get ready for a fast ride. For more information, call toll-free **1-800-444-1982**; in Texas or outside the USA call 512-345-7791.

MICROGATE
CORPORATION

MicroGate is a registered trademark of MicroGate Corporation; IBM PS/2, Micro Channel and OS/2 are trademarks of IBM Corporation.

NEW PRODUCTS—SOFTWARE

Development tools

Release 1.5.1 of MAX/SPF, a productivity tool designed by Integrity Solutions, Inc., increases the speed of functions within ISPF/PDF.

The enhanced version includes the following ISPF features: the ability to issue global commands across a group of members, cut and paste facilities and an advanced printing facility.

The product may be purchased alone or in combination with MAX/VSAM. Pricing ranges from $3,500 to $12,000, depending on CPU size and configuration.

Integrity Solutions
7921 S. Park Plaza
Littleton, Colo. 80120
303-794-5505

Software Management, Inc. has announced an enhanced version of its computer-aided software engineering tool box and workbench designed for the IBM Application System/400.

Supervisor Release 3.0 includes word processing and library administration functions. It enables users to analyze and automatically document applications and supports them running in System/36, 38 and Native environments.

Supervisor is available for System/38 and all AS/400 models for $2,500.

Software Management
No. 225
3870 La Sierra Ave.
Riverside, Calif. 92505
714-359-1087

Utilities

Polestar Software has announced a product that provides users of Digital Equipment Corp. VT systems with enhanced windowing capabilities.

Polestar Windows Version 2 features simultaneous display windows, hot-key switching, multitasking, scripting and the ability to cut and paste between applications.

The product runs on DEC VT100, VT220 and VT320 terminals, compatibles and emulators. A single-unit license sells for $495.

Polestar
109½ W. Broadway
Fairfield, Iowa 52556
515-472-2445

Interleaf, Inc. has announced the 3270 Viewstation and a print filter for IBM Advanced Function Printing (AFP) devices — software designed to allow users to distribute and print full text and graphics documents from an IBM mainframe.

Viewstation enables users to distribute documents for what-you-see-is-what-you-get viewing to mainframes. The AFP print filter allows users to print from a mainframe.

The AFP print filter costs from $35,000 to $75,000, and the Viewstation sells for $50,000 to $110,000, depending on type of system used.

Interleaf
Ten Canal Park
Cambridge, Mass. 02141
617-577-9800

Advanced Systems Concepts, Inc. (ASCI) has announced Version 1.0 of its Virtuoso Virtual Disk and Disk Caching system, a software package designed for Digital Equipment Corp. VMS systems.

The product can support a memory- or disk-based virtual disk, a software-created device that uses memory or disk drives. It also supports read/write disk caching for local or Vaxcluster systems as well as caching of hot files.

Pricing for Virtuoso Version 1.0 ranges from $750 to $15,000, depending on CPU model used.

ASCI
33-41 Newark St.
Hoboken, N.J. 07030
201-798-6400

C
E
N
T
A
U
R

WILL YOU
KNOW
DB2/SQL?

WITH TLM'S PC
CENTAUR DB2/SQL
TUTORIALS AND PC "SMART"
MANUALS YOU'L BE
PREPARED FOR ANYTHING

D
B
2

S
Q
L

3 PC CBT TUTORIALS
1. SQL PROGRAMMING
2. APPLICATION DEVELOPMENT
3. DATA BASE DESIGN.
PLUS TLM'S "SMART" MANUAL PC SYSTEM, ONLINE DB2 REFERENCE

FREE WITH ORDER:TLM'S DB2/SQL DEVELOPER'S GUIDE, 400 PGS A $19.95 VALUE.

INSTALLS ON ANY PC, XT, AT, PS/2, WITH 512K AND HARD DISK

COMPLETE PC SOFTWARE W/ GUIDE ONLY $79.95
DEVELOPER'S GUIDE W/O SOFTWARE ONLY $19.95
CALL TODAY 800-451-1392 OR 914-937-4651
VISA/MC/CORPORATE INVOICE ADD $5 P/H

TLM, 420 WESTCHESTER AVE, PORT CHESTER NY 10573

COMMENTARY

Emanuela S. Miller

Bare-bones prevention

Paul Mace, the guru of data recovery, classifies computer users into two categories: those who have lost valuable data and those who are about to.

Be it because of procrastination or fear, millions of computer users fail to consider what they will do when the inevitable happens: The darn thing stops working. Only then do they realize that they have been sloppy about disaster prevention.

Many people do with the bare minimum when it comes to backing up data. Too often, the personal computer user will say, "Well, it's just a little PC. Why do I have to worry?" Yet in many companies, more data typically is stored on individual PCs than actually resides on the mainframe or network. What happens to the work of the individual employee if his or her PC goes?

Disaster recovery actually consists of two phases. The first phase is prevention. The second phase is the recovery itself. But the top priority in disaster recovery is to make a plan. There are several elements to a reasonable plan: It must be in writing, it must be tested, and it must be updated annually.

This last is especially key. It is amazing how fast things change. Just ask yourself: Where are the latest disks of all the software we bought in the

Continued on page 50

Movie-making abracadabra

Cinematic special effects materialize from workstations, not wands

ON SITE

BY JAMES DALY
CW STAFF

SAN RAFAEL, Calif. — Motion picture special effects have come a long way since dangling trash can lids passed for attacking alien spacecraft in the cheesy sci-fi movies of the 1950s.

These days, movieland's technicians of trickery can turn out such films as *Who Framed Roger Rabbit,* which transforms a squeaky cartoon rabbit into a reality-bending member of the real world who effortlessly interacts with flesh-and-blood actors. All it takes is a handful of workstations, off-the-shelf software and some of the most creatively warped minds in the business.

"Computer graphics in films are not a novelty anymore," said Nancy St. John, executive producer at Industrial Light and Magic (ILM), one of the foremost practitioners of the art of special effects. The firm, which was created by film director George Lucas, has lent its cinematic phantasms to *Who Framed Roger Rabbit, Star Wars* and the trio of *Back to the Future* pictures, among others, and has raked in several Oscars for its efforts.

What is surprising about ILM, however, is that some of the industry's most eye-popping special effects come out of such a relatively simple computer setup. There are no mainframes, minicomputers or elaborate networks in ILM's unassuming creative offices. Instead, a series of Ethernet-linked Silicon Graphics, Inc. and Sun Microsystems, Inc. workstations run a series of homegrown software packages as well as off-the-shelf graphics applications from companies such as Pixar and Alias Research, Inc.

"We don't want to have a mainframe, because if it goes down, everyone goes down, and that's no way to survive," St. John said.

ILM *uses a skillful blend of technology and creativity for cinematic magic*

However, this elementary setup must also handle some very demanding projects. Graphics animation in motion pictures is very computing-intensive. Technical director Lincoln Hu estimated that each frame of a sophisticated animation sequence can demand anywhere from 5M to 20M bytes of system memory, and most movies run at 24 frames per second.

Being an industry innovator, ILM's computer jobs also get progressively tougher. "In the special effects business, we've got to beat ourselves every time," Hu said. "But whenever we double the resolution, we quadruple our storage space requirements."

Man-hours are also long. A 30-second ketchup commercial, for instance, which provides an ant-eye view of a picnic, may take eight or nine weeks of computer animation, St. John said.

ILM's newest move to lighten this load is its digital compositing system, which bridges the gap between the computer graphics and film worlds. The system works by using a custom-made scanner to enter the film images into a computer system, where they are then manipulated digitally onto video and then output back onto film.

Hu cited several advantages of the digital compositing system over traditional film opticals, including the ability to create multiple images without generational loss or image degradation and the absence of "outlines" like those associated with blue-screen matting.

Digital compositing also allows ILM to create images that cannot be realized by building models. Hu noted that the big change in digital compositing is that it is completely transparent. In *Back to the Future II,* ILM removed visible wires from several scenes and filled in the wire marks with computer-generated imagery.

The compositing system is still not enough. The fact is, technicians at ILM may never have enough computing power or image resolution. "If the technology ever matches the scope of our imaginations," Hu said, "I'd be really surprised."

Graphical upstart quelled

BY CHARLES VON SIMSON
CW STAFF

REDMOND, Wash. — Skeptics unconvinced by the personal computer industry's claims of a graphical revolution are not likely to be converted by a study sponsored by Microsoft Corp. Far from demonstrating the necessity of graphical systems, the study shows significant improvement in less than half the categories tested.

Lexington, Mass.-based consultant Temple, Barker & Sloane, Inc. conducted a study of 120 Boston-area white-collar PC users sponsored by Microsoft and Zenith Data Systems. The study was designed to quantify the intuitive evidence that graphical interfaces are better than character-based systems.

The study shows some advances for graphical interface users. In one area, members of the survey group of experienced users working with a graphical in-

Continued on page 55

The COBOL Programmer Workstation and Its Impact on Productivity
The Micro Focus Developers Seminar Schedule

The Programmer Workstation environment uses personal computers as intelligent, distributed workstations for developing, testing and maintaining host-based COBOL applications. At these Developers Seminars you will:

☞ See the positive impact the programmer workstation can have on programmer productivity

☞ See an in depth technical demonstration of the Micro Focus COBOL/2 Workbench facilities

☞ Watch CICS and IMS code offloaded from the host, running under the integrated Workbench testing environment

☞ Evaluate the workstation's potential in your organization

☞ Learn about latest product developments and future trends

July 10th	Indianapolis, IN
July 12th	Dallas, TX
July 12th	Buffalo, NY
July 19th	Nashville, TN
July 24th	Arlington, VA
Aug 7th	Cincinnati, OH
Aug 9th	Boston, MA
Aug 14th	Los Angeles, CA
Aug 14th	Charlotte, NC
Aug 21st	Chicago, IL
Aug 23rd	Pittsburgh, PA
Aug 28th	Salt Lake City, UT

MICRO FOCUS®
A Better Way of Programming™

There is *no charge* for attending a Micro Focus Developers Seminar. For more information about the Developers Seminar or about Micro Focus products call **415-856-4161**.

MONO

Traditional PC LAN

AViiON is a trademark of Data General Corporation. UNIX, Novell NetWare, MS/DOS, OS/2, and Macintosh are the respective registered trademarks of AT&T, Novell Inc., Microsoft Corp., International Business Machines, Inc., and Apple Computer, Inc. ©1990 Data General Corporation.

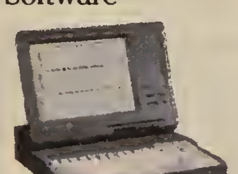
VS. MULTI

PC LAN with AViiON Server

Call 1-800-DATAGEN to learn how Data General and Novell NetWare let your PC LAN do more.

Data General has a host of Novell Portable NetWare® solutions that let your existing PC LAN run multiple applications simultaneously. Novell Portable NetWare on a Data General AViiON™ gives your PC LAN the power to share MS/DOS®, OS/2®, MAC/OS®, and UNIX® files. The power to cruise through MS/DOS, OS/2, and UNIX applications. And, the power to share peripherals.

Data General's NetWare for AViiON is the first RISC-based NetWare platform. It's fully scalable and can share the server with major standards like TCP/IP. It also uses the standard NetWare client software and Novell's IPX/SPX Networking Protocol, so it interoperates with existing Novell LANs. It lets users access scores of applications. And, Data General offers a Software Developer's Kit to facilitate the development of client-server applications.



Data General's line of Novell NetWare solutions brings transparent networking and distributed applications to all your PC clients.

To learn more about how an AViiON server with Novell's Portable NetWare can bring more power and more applications to your LAN, call the distributors listed below or 1-800-DATAGEN. Also, ask about Data General's full line of PCs.

Data General
3400 Computer Drive, Westboro, MA 01580

DATA GENERAL'S NOVELL NETWARE DISTRIBUTORS

GATES/FA Distributing
121 Interstate Blvd.
Greenville, SC 29616
Sales: 800-332-2222
Customer Support: 800-332-2299
Technical Support: 800-332-2315
Credit: 800-332-3497

Western Microtechnology, Inc.

1637 North Brian Street
Orange, CA 92667
(714) 637-0200

14636 N.E. 95th Street
Redmond, WA 98052
(206) 881-6737

6837 Nancy Ridge Drive
San Diego, CA 92121
(619) 453-8430

12900 Saratoga Avenue
Saratoga, CA 95070
(408) 725-1660

28720 Roadside Drive
Agoura Hills, CA 91301
(818) 707-0377

1800 N.W. 169th Place
Beaverton, OR 97006
(503) 629-2082

20 Blanchard Road
Burlington, MA 01803
(617) 273-2800

2545 Tarpley Road
Carrollton, TX 75006
(214) 416-0103

264 Passaic Avenue
Fairfield, NJ 07006
(201) 882-4999

Four Eves Drive
Marlton, NJ 08053
(609) 596-7775

Your SQLWindows applications will thrill even the toughest characters.

We created our SQLWindows® graphical database application development system to satisfy the needs of the toughest, most demanding group of users in the world. Yours.

And today, thanks to the popularity of Microsoft® Windows, your users are demanding even more from their applications. Like more powerful graphics and visual, menu-driven interfaces.

No wonder more developers are turning to SQLWindows for the graphical database applications they need. Its unique combination of SQL with a 4GL graphical programming environment, brings even the most complex applications vibrantly to life. While cutting development time from months to days.

The result is a whole new breed of programs with exciting graphics, mouse support, and pull-down menus. Multi-user programs that work with most PC LANs, and provide access to the most popular SQL database servers.

In fact, once you've tried SQLWindows, you may never return to your old character-based tools. What's more, it's just one member of an entire family of solutions for enterprise-wide data sharing from Gupta Technologies. Including SQLBase® Server, the fastest LAN-based server available today, and SQL-Network, the solution for DB2 and Oracle connectivity.

The thrill is here: call Gupta today.

Turn your toughest application needs into visually powerful Windows or OS/2 PM* programs with SQLWindows. And put the thrill back into your database programming. Call **1-800-876-3267** now for more information.

Gupta
TECHNOLOGIES INC.
1040 Marsh Road, Menlo Park, CA 94025
415/321-9500

© 1990 Gupta Technologies Inc. SQLWindows and SQLBase are registered trademarks of Gupta Technologies Inc. All other registered trademarks and trademarks are those of their respective companies. *PM version - Q4, 1990.

PRODUCT REVIEWS

Magellan explores new formats

Lotus Development Corp.'s Magellan is a multifaceted utility that combines characteristics of a text database and a DOS shell. Magellan 2.0 retains the basic look and feel of its predecessor.

With files listed along the left side of the screen and file contents displayed to the right, it is a snap to find data that is scattered across a hard disk. Reprogrammable function-key commands are displayed in a template along the bottom of the screen, putting all the program's major commands right at hand.

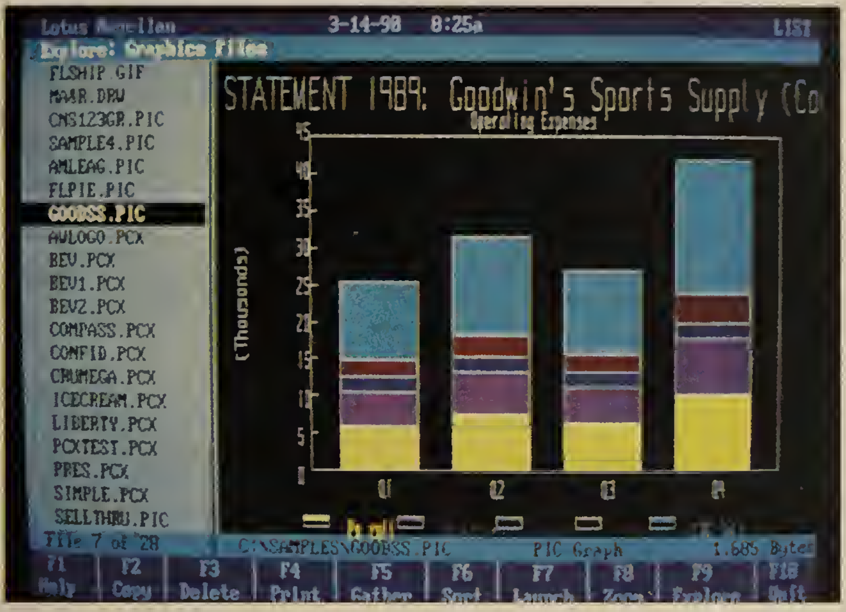
Magellan 2.0 requires 330K bytes of memory to boot, nearly 200K bytes less than Version 1.0 required, and the program will automatically take advantage of expanded memory if it is available. When users launch an application, Magellan occupies only about 6K bytes of system memory.

It now offers a high-resolution, 94-column display mode for users with IBM Video Graphics Array (VGA) monitors. Graphics files cannot be viewed, however, when the program is running in the VGA mode.

Magellan is unmatched in its primary purpose — searching through and viewing files in their native formats. Version 2.0 enlarges Magellan's list of supported file formats to more than 40. Several of the viewers offered — including Lotus' 1-2-3 Release 3.0 and Agenda — are unavailable in other viewer programs.

Virtually all of the major word processors are included, with the notable exceptions of the new programs designed for Microsoft Corp.'s Windows: Microsoft's Word for Windows and Samna Corp.'s Ami Professional.

Among the viewers added in Version 2.0 are several of the major graphics formats, including 1-2-3 .PIC, Freelance .DRW, .PCX and .GIF files. Magellan even allows users to view files that have been compressed with the new PK-Zip compression program.



Lotus' Magellan 2.0 *supports more than 40 file formats*

Magellan's viewers take about half a second to call up a file's contents, with the exception of those that display graphics files and compressed files.

Magellan's searching capabilities are unchanged. Once files have been indexed, searching for character strings is a nearly instantaneous process.

Boolean operators (and, or, not) can be used, and the program's fuzzy search routine will grab all files that contain the specified text string or something close to the specified string. The program then ranks the files retrieved according to the exactness of the match and the frequency of the text string in the file.

The program is also extremely quick when searching for character strings within a file. Using the Find command, all occurrences of a string in a text will be highlighted as it is typed. There is also a new Quick-Search feature that retrieves and displays only those lines in a document that contain a specified string.

Magellan offers a complete set of file management capabilities, including the ability to copy, move and delete tagged groups of files either on a drive or across drives.

Several major features have also been added in the current version, including an undelete utility, file and directory comparison, a flexible backup and restore feature and the capability to preserve directory structures when copying groups of files.

Magellan comes with a thorough, well-indexed manual that includes a tutorial chapter. In addition, there is a small booklet that offers tips on how to get more out of using the program as well as a quick-start guide. On-line Help is very well designed and context-sensitive.

There is also an on-line "introductory tour" that familiarizes users with the basic features of Magellan's screens.

Installation is simple. Magellan automatically reads the hard disk for applications and creates launch setups for loading them.

Magellan's basic features are well designed and easy to learn, although it can be tough to get the hang of some of the advanced features, such as writing macros or setting up multiple-index specifications. Working with Magellan would be considerably easier if the program supported a mouse.

Lotus provides six months of toll-free technical support by a knowledgeable staff. After that, free (but not toll-free) telephone support is available. Technical support hours are 8:30 a.m. to 8 p.m. Eastern Standard Time, Monday through Friday.

Magellan is unique in its combination of viewing and text search capabilities. No other program makes it quite as easy to find files and view their contents in native formats.

Virtually any user will find Magellan a personal productivity tool at $139.

Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, Mass. 02142, 617-577-8500.

Magellan Version 2.0

Price: $139

- Performance: Very good
- Documentation: Very good
- Ease of learning: Good
- Ease of use: Very good
- Error handling: Good
- Support: Good - Very good
- Value: Excellent

Dbfast Windows speaks Dbase language fluently

Dbfast Windows, Bumblebee Software, Inc.'s Dbase language compiler for Microsoft Corp.'s Windows, does well in what it sets out to do: make easy-to-use Windows programs out of plain-Jane Ashton-Tate Corp. Dbase files. Unfortunately, it lacks many of the tools on which programmers rely, such as a screen designer, solid report writer and sophisticated debugger.

Where the program really shines is in its implementation of the Dbase language. Standard Dbase commands and functions are supported. Many enhancements add arrays, user-defined function support, Soundex, dynamic data exchange links, windows and graphing functions. However, it is an imperfect fit. Dbase was not designed for a graphical environment, and some features are difficult to integrate smoothly.

Standard Windows interface tools such as mouse support, pull-down menus, lists and buttons can be created with a few lines of code. Graphing commands let users present data in the form of line, bar or pie graphs. Bit-mapped images can be displayed on-screen or stored as part of a record. Dbase macros are supported but may not contain any commands, key words or separators. The use of standard Dbase database and index file formats means the data can be easily accessed outside of the Windows environment.

Besides the glitzy screen commands, Dbfast Windows also provides subtle enhancements that greatly increase a programmer's productivity. There are new options for prompt messages, valid clauses, error messages and font specification as well as more control over field

Continued on page 47

Dbfast Windows Version 1.44

Price: $395

- Performance: Very good
- Documentation: Satisfactory
- Ease of learning: Very good
- Ease of use: Good
- Error handling: Satisfactory
- Support: Good - Very good
- Value: Good

DB2 ON YOUR PC

Develop full scale DB2 applications on your PC! Join the thousands of DB2 developers already benefiting from the productivity gains provided by the XDB-COBOL Workbench for DB2.

XDB puts a 100% DB2 compatible SQL DBMS and COBOL precompiler in your PC—seamlessly integrated with Micro Focus COBOL/2 and PC-CICS for interactive development.

Multi-user development can be supported by the XDB-SQL Database Server in MS-DOS, UNIX, OS/2, and Netware 386 environments.

"The only tool available that adheres closely enough to IBM's DB2 to allow applications developed on the PC to be migrated to the mainframe with little or no modification."
PC Week
June 12, 1989

"Develop on PCs . . . then run the finished software without changes against DB2 data on mainframes thanks to XDB's DB2-compatible database server software."
DBMS
January 1990

Interested in DB2 power on a PC?

Call (301) 779-6030

XDB Systems, Inc.
7309 Baltimore Avenue
College Park, MD 20740
FAX (301) 779-2429

1990 XDB Systems, Inc. XDB is a registered trademark of XDB Systems, Inc. DB2 is a trademark of IBM. Other product names are trademarks of their respective holders.

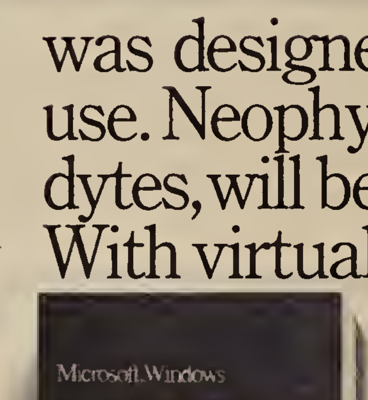
Now, all it takes is
and you're

It's only fair to warn you that exposure to new Microsoft® Windows™ version 3.0 has been linked to obsessive and habitual usage. Why?

Because with a simple click of the mouse users can connect to the network, even access and manage network resources. All without cumbersome keyboard commands.

Which means users are now able to share data. Not frustration.

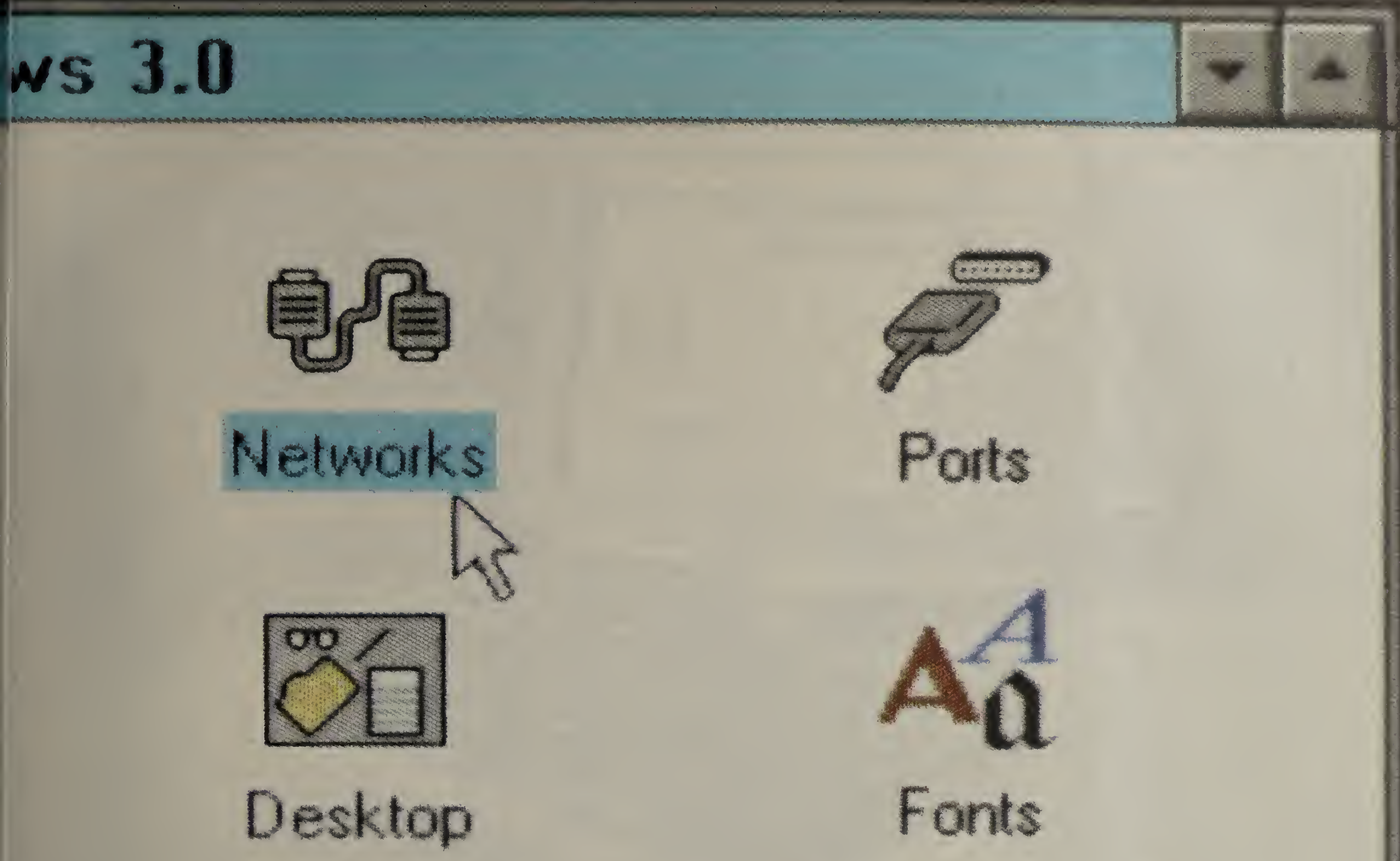
While in the interest of time, the Windows 3.0 graphical user interface was designed to be easy to learn. And use. Neophytes, not to mention troglodytes, will be up and running in no time. With virtually no training.



Now, 286/386™ machines running MS-DOS® will no longer be limited to 640K. So there are no more impediments.

Users can even enjoy a network connection and at the very same time satisfy the cravings of multiple applications.

For more information, call (800) 323-3577, Dept. L21. In Canada, call (416) 673-7638. Outside the U.S. and Canada, call (206) 882-8661. ©1990 Microsoft Corporation. All rights reserved. Microsoft, MS-DOS and the Microsoft logo



a point and click hooked.

And since Windows 3.0 has a modular setup program, a single copy now memorizes every user configuration on the network. Which means, so to speak, one size fits all.

Furthermore, Windows 3.0 has redefined its relationship with IBM® 3270 emulation programs. Users can now download corporate data and easily share it with Windows applications. Something we have come to call peaceful coexistence.

One last point. Because Windows 3.0 has been optimized for machines with 1-2 megabytes of RAM, it will go a long way towards protecting your hardware investment.

Call (800) 323-3577, Department L21, for a backgrounder that outlines how Microsoft Windows 3.0 could benefit your corporation.

We're certain that you'll agree it's a habit well worth forming.

Microsoft
Making it all make sense™

are registered trademarks and Making it all make sense *and Windows are trademarks of Microsoft Corporation. IBM is a registered trademark of International Business Machines Corporation. 386 is a trademark of Intel Corporation.*

Thursday, 30 November 1995 08:21
Time Allocation for Thursday, 30 November 95
Today
November Avg.
Schedule
WYSE

From Forerunner to Front Runner.

The WY-150 arrived ahead of its time. It set price/performance standards that will remain for years to come. And we're still moving ahead, leading the way into the new decade. With the flexibility and connectivity that bridges the worlds of ASCII, ANSI and PCs. All while meeting the most exacting ergonomic standards at an affordable price.

And the WY-150 is compatible with a wide range of operating systems. Including UNIX, XENIX, MS-DOS, Concurrent DOS, PC-MOS, and PICK.

It also establishes a number of advanced ergonomic standards. The 78 Hz refresh rate eliminates any hint of flicker. Just as overscanning and a bezel that matches the soft, paper white phosphor erase distracting borders. (Amber and green phosphors are also available.) The oversize 10x16 cell makes each crisp character stand out clearly and vividly.

Of course, the WY-150 is backed by the service and support of Wyse. The world's leading independent terminal maker.*

The WY-150. It can lead you into the future. Today. Call 1-800-438-9973 for more information on the WY-150.

1-800-GET-WYSE

WYSE

Wyse is a registered trademark of Wyse Technology. WY-150 is a trademark of Wyse Technology. Other trademarks/owners: UNIX/American Telephone and Telegraph; Concurrent DOS/Digital Research Inc.; PC-MOS/The Software Link, Inc.; PICK/Pick Systems; MS-DOS, XENIX/Microsoft. *IDC 1988 U.S. Terminal Census.

Introducing a new
concept in software
with a name that says it all. . .
ACCESS
MANAGE
DATA
PRESENT
ANALYZE

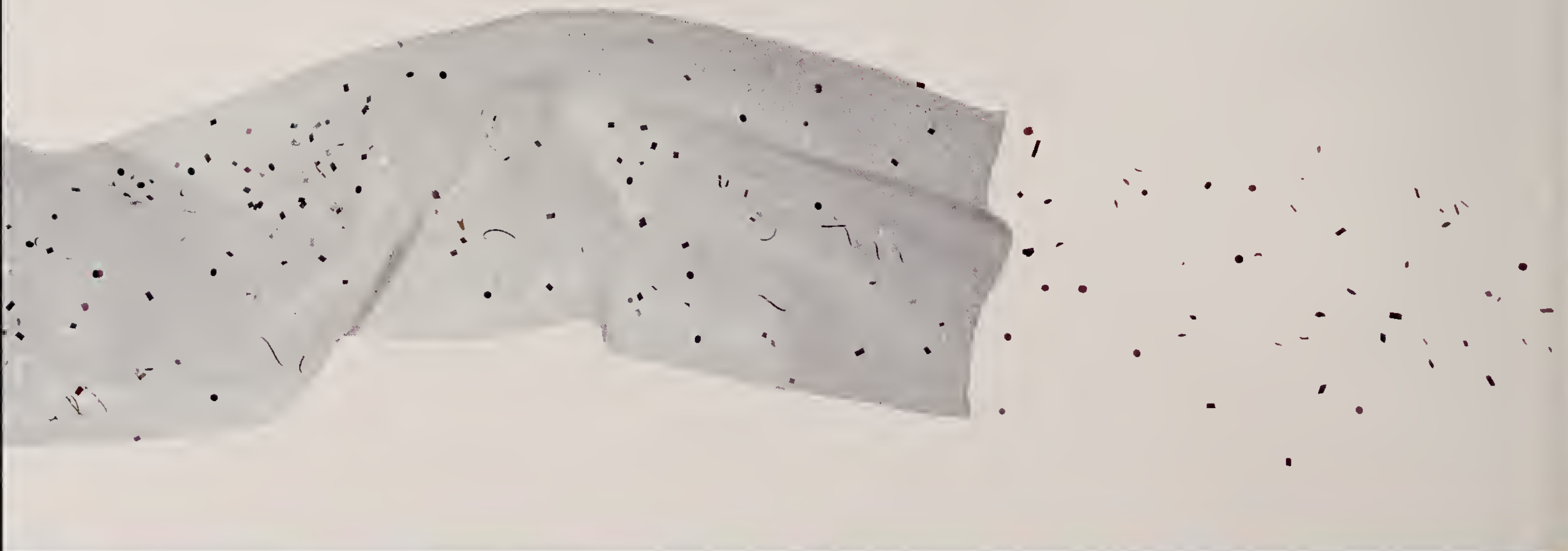
What's in a name?

Plenty. Especially when the name is the SAS System...the most popular applications system in the world. Over the years, it has come to symbolize reliability, power, and productivity.

The NEW SAS® System

The world's #1 applications system

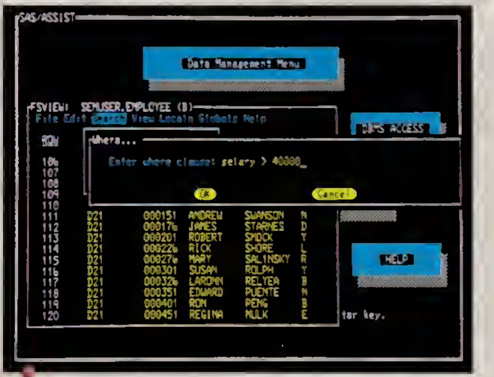
And now the SAS System means even more. It means you have the flexibility to choose software from an *applications* point-of-view instead of a hardware point-of-view. It means you can master the four key data-driven tasks — data access, management, analysis, and presentation — through a single software system. It means you can extend applications to more computer users, regardless of experience level. And it means you'll be the beneficiary, not the victim, of emerging computing technologies.



We've put the emphasis on the end results.

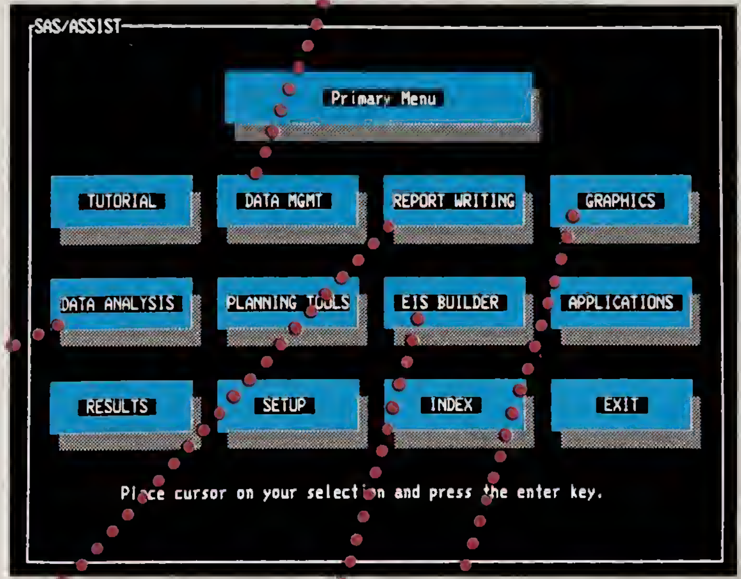
With the SAS System, it doesn't matter who's running an application. Or how. Or where. You can approach the SAS System from any experience level in just about any environment and be assured of the same reliable results.

We've designed the SAS System to be equally responsive to both inexperienced users and power users. At the very center of our new release is a task-oriented, menu-driven user interface.

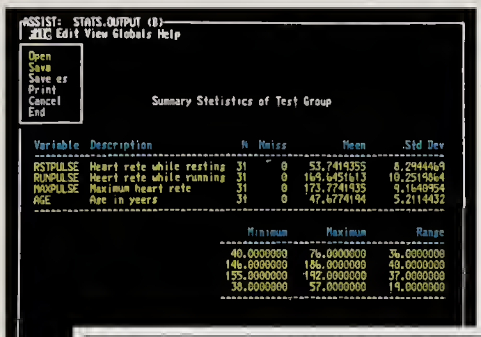

SAS/ASSIST
Data Management Menu
FSVIEW: SEMUSER.EMPLOYEE (B)
File Edit Search View Locals Globals Help
DBMS ACCESS
Where...
OK
Cancel
HELP

```
Enter where clause: salary > 40000_
```

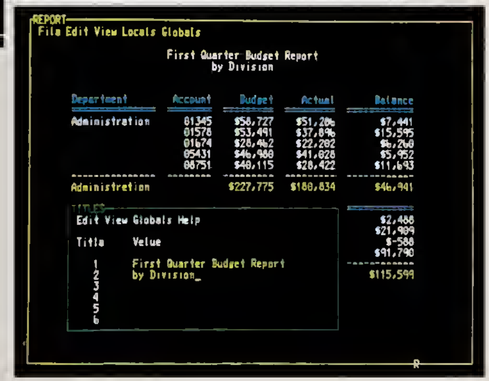
```
ROW
106
107
108
109
110
111  D21  000151  ANDREW   SWANSON   N
112  D21  000176  JAMES    STARNES   D
113  D21  000201  ROBERT   SMOCK     Y
114  D21  000226  RICK     SHORE     L
115  D21  000276  MARY     SALINSKY  R
116  D21  000301  SUSAN    ROLPH     Y
117  D21  000326  LARONN   RELYEA    B
118  D21  000351  EDWARD   PUENTE    N
119  D21  000401  RON      PENG      B
120  D21  000451  REGINA   MULK      E
```



Place cursor on your selection and press the enter key.



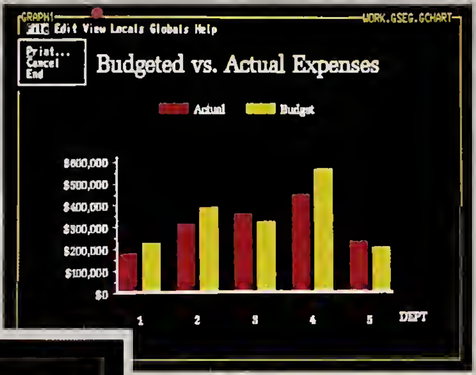
```
                  Summary Statistics of Test Group

Variable  Description                N  Nmiss        Mean      Std Dev
----------------------------------------------------------------------
RSTPULSE  Heart rate while resting  31      0   53.7419355   8.2944469
RUNPULSE  Heart rate while running  31      0  169.6451613  10.2519864
MAXPULSE  Maximum heart rate        31      0  173.7741935   9.1640954
AGE       Age in years              31      0   47.6774194   5.2114432
----------------------------------------------------------------------

                                   Minimum      Maximum        Range
                               ---------------------------------------
                                40.0000000   76.0000000   36.0000000
                               146.0000000  186.0000000   40.0000000
                               155.0000000  192.0000000   37.0000000
                                38.0000000   57.0000000   19.0000000
                               ---------------------------------------
```

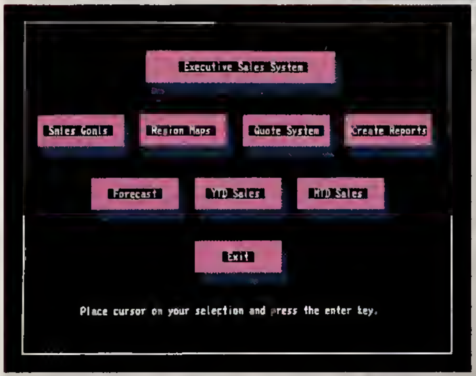


```
              First Quarter Budget Report
                      by Division

Department        Account     Budget     Actual     Balance
==============    =======   ========   ========   =========
Administration      01345    $58,727    $51,286      $7,441
                    01578    $53,491    $37,896     $15,595
                    01674    $28,462    $22,202      $6,260
                    05431    $46,980    $41,028      $5,952
                    08751    $40,115    $28,422     $11,693
--------------    -------   --------   --------   ---------
Administration              $227,775   $180,834     $46,941

                                                  =========
                                                     $2,488
                                                    $21,909
                                                      $-588
                                                    $91,790
                                                  ---------
                                                   $115,599
```

```
Title      Value

  1        First Quarter Budget Report
  2        by Division_
  3
  4
  5
  6
```

It's never been easier to access, manage, analyze, or present data. You can even build your own executive information systems.





Place cursor on your selection and press the enter key.

The menus, powered by keywords, make it even easier to run the SAS System's most widely used applications. Without having to know a word of syntax, users can access a data base…read in data…perform analyses ranging from simple statistics to specialized applications such as forecasting, project management, and quality improvement…and generate a variety of reports and graphs.

If you're approaching the SAS System from an applications development viewpoint, you'll find all the capabilities you'd ever expect in a powerful and productive programming environment. And then some.

There's a command-driven interface especially for systems analysts, applications developers, MIS personnel, and the Information Center staff.

From this interactive windowing environment, you can use the SAS System's English-like commands to build applications in a fraction of the time. And you can customize any application any way you choose by adding user-friendly menus and fill-in-the-blank screens.

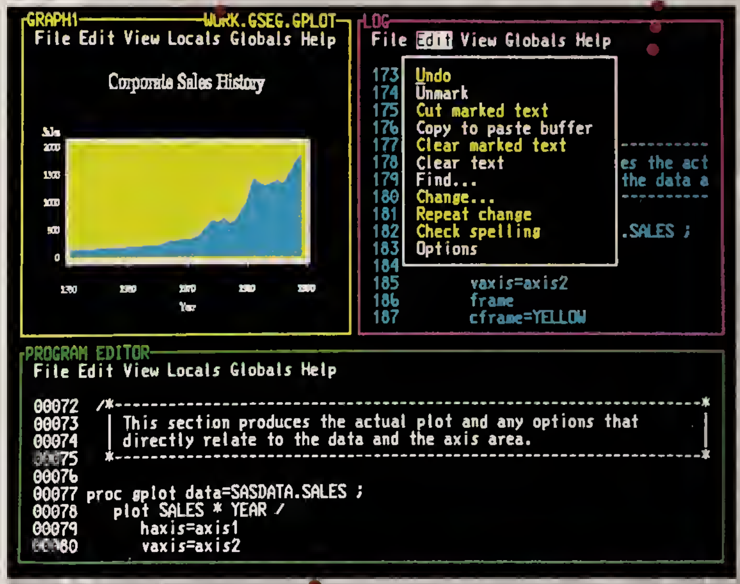
We've made sure you'll never get boxed in.

While the industry struggles to define a common operating environment, the SAS System eliminates the need for one.

Our exclusive MultiVendor Architecture™ gives you the power to decide where a particular application belongs — in the data center, at the departmental level, on the desktop, or a combination of all three. The SAS System, and the work you do, is portable across the entire range of computing environments.

A dynamic programming interface lets you customize your development environment. As your program takes shape, so do the results.

Monitor programs as they execute. Pull-down menus make editing, file management, and other essential programming tasks easy.



```
173
174
175
176
177                          ----------
178                          es the act
179                          the data a
180                          ----------
181
182                          .SALES ;
183
184
185          vaxis=axis2
186          frame
187          cframe=YELLOW
```

```
00072 /*-----------------------------------------------------------*
00073  | This section produces the actual plot and any options that |
00074  | directly relate to the data and the axis area.             |
00075  *-----------------------------------------------------------*
00076
00077 proc gplot data=SASDATA.SALES ;
00078    plot SALES * YEAR /
00079       haxis=axis1
00080       vaxis=axis2
```

Directly access and manipulate the SAS System's English-like command language.

digital
Cooperative Marketing Program™

Prime™

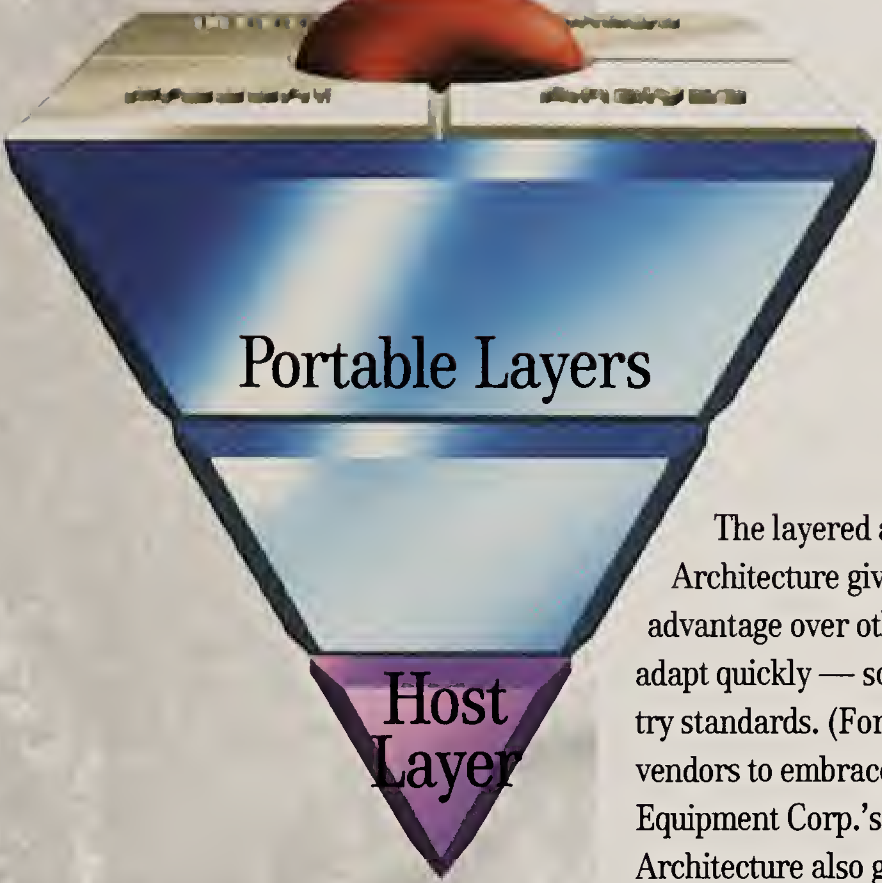
hp

SiliconGraphics
The 3D Computer Company

HEWLETT PACKARD

IBM

sun microsystem



The layered approach of our MultiVendor Architecture gives the SAS System a unique advantage over other software. The SAS System can adapt quickly — sometimes instantly — to new industry standards. (For instance, we were among the first vendors to embrace both IBM Corp.'s SAA and Digital Equipment Corp.'s NAS in one system.) MultiVendor Architecture also gives you the freedom to exploit new and emerging hardware technologies — such as DECwindows,™ X Windows, Presentation Manager,™ and other native windowing interfaces — without worrying about your existing inventory of applications.

With the SAS System, you'll always have state-of-the-art software for state-of-the-art equipment. You'll never again be boxed in to a particular hardware platform.

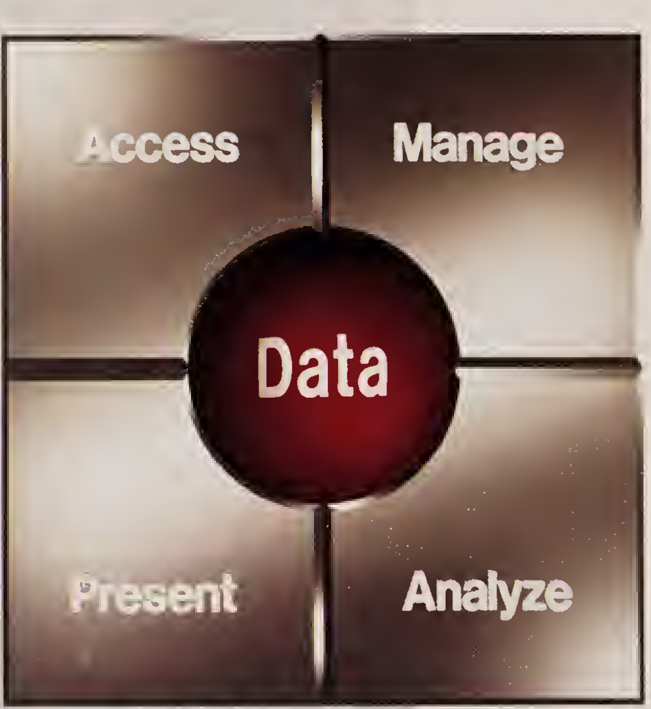
And that's a promise.

Data General

Catalyst
Advantage
Program

SAS software lets you stay on the leading edge of such new technologies as native windowing.

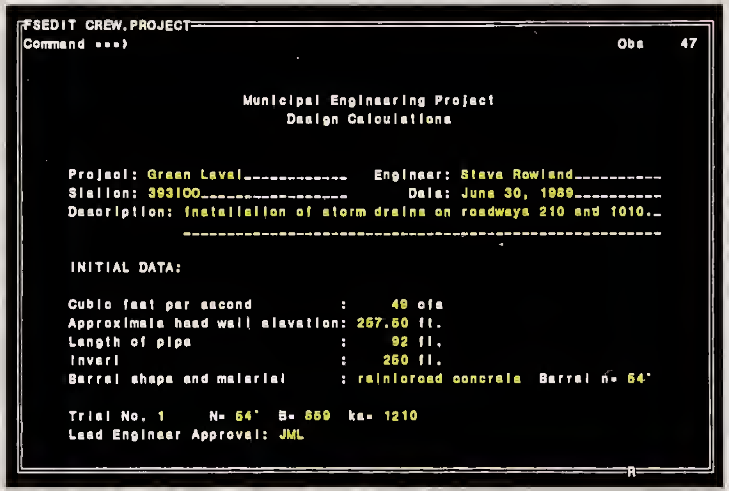
We've given you total control in four strategic areas.



There are four data-driven tasks common to all your computing applications. We've designed the SAS System with these tasks in mind.

The first task is to identify and *access* the data you need. With the SAS System, you'll find direct and transparent interfaces between your applications and the most popular data base management systems such as DB2, SQL/DS,™ ORACLE,® Rdb/VMS,™ Lotus 1-2-3,® dBASE,® and SYSTEM 2000.® You can get your hands on data without having to know data base terminology, and without sacrificing data base security. What's more, the SAS System's support of SQL™ gives programmers a standard language for data query. The SAS System can also be used to access raw data files in any format — even files with messy or missing data.

But getting data from place to place is just part of the challenge. Data *management* is also key, and the SAS System responds with efficient ways to enter new data ... edit and query data files ... and manipulate your data. You can even merge data from totally different kinds of files. And your inexperienced users can enter their data through customized fill-in-the-blank screens that look exactly like your business forms.

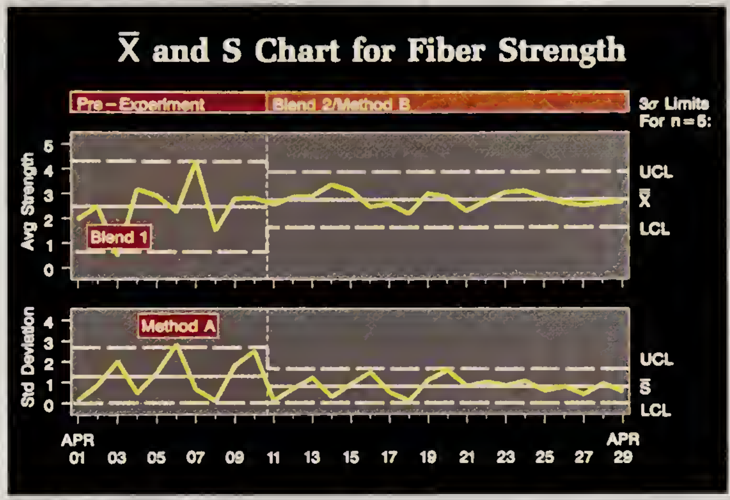


```
FSEDIT CREW.PROJECT
Command ===>                                                   Obs    47


                      Municipal Engineering Project
                           Design Calculations


   Project: Green Level____________   Engineer: Steve Rowland__________
   Station: 393100_________________       Date: June 30, 1989__________
   Description: installation of storm drains on roadways 210 and 1010._
                ________________________________________________________

   INITIAL DATA:

   Cubic feet per second         :     49 cfs
   Approximate head wall elevation: 257.50 ft.
   Length of pipe                :     92 ft.
   Invert                        :    250 ft.
   Barrel shape and material     : reinforced concrete  Barrel n= 54'

   Trial No. 1     N= 54'  B= 859  ka= 1210
   Lead Engineer Approval: JML
```

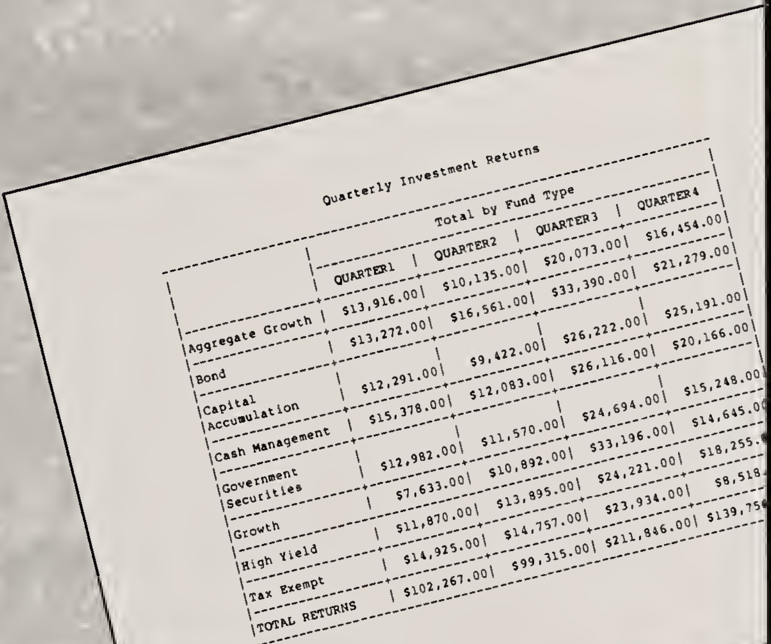
Users can take a common-sense approach to data entry using fill-in-the-blank screens.

Turning data into meaningful information has always been a hallmark of the SAS System. And now you'll find more ways to *analyze* data than ever before... everything from descriptive statistics to advanced multivariate techniques. You'll also find specialized tools for virtually any kind of business need: planning, forecasting, electronic spreadsheets, operations research, decision support, and more. Plus the most sophisticated methods for statistical quality improvement and experimental design.

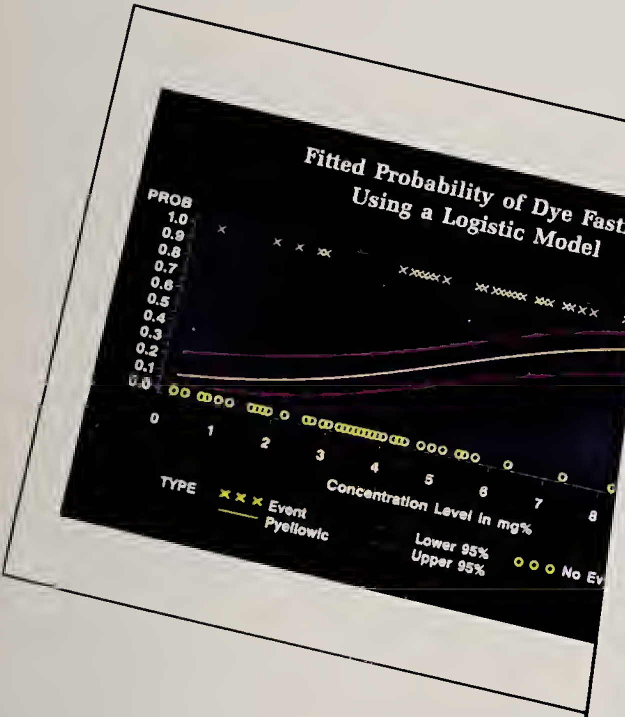
And once you have analyzed your data, the SAS System makes it easy to get the attention you, and your data, deserve. Our data *presentation* capabilities are unsurpassed — from simple printed lists to spectacular full-color graphics. Here's just a sample:

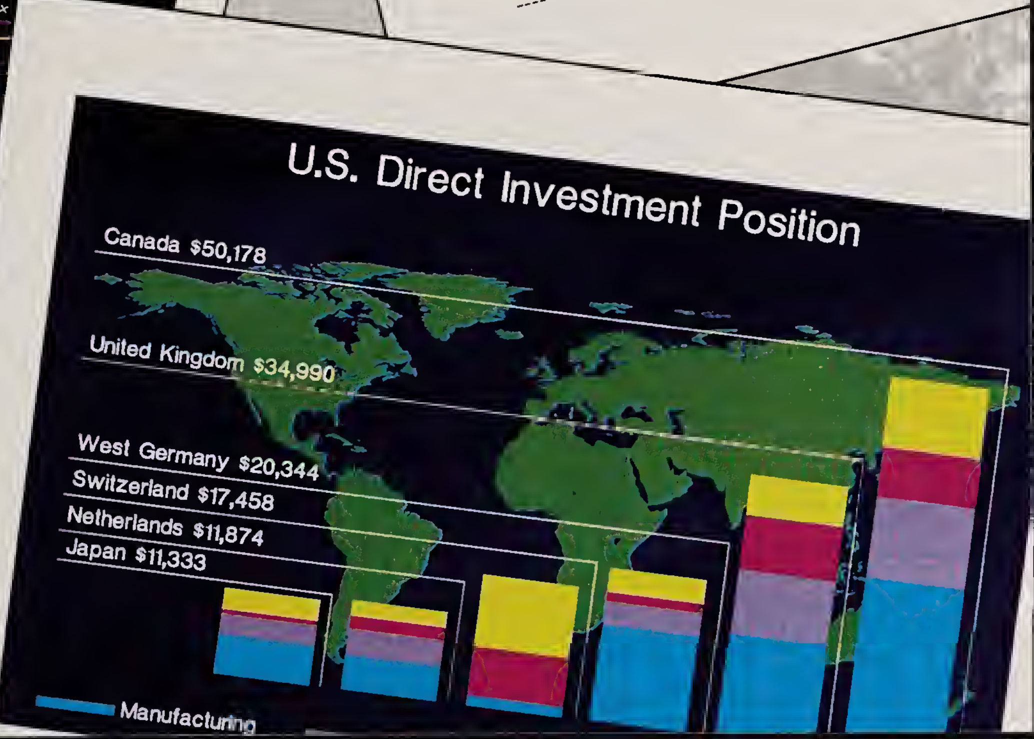


You can rely on one software to handle all your analytical needs.



```
                     Quarterly Investment Returns
 ----------------------------------------------------------------------
 |                 |                 Total by Fund Type               |
 |                 |--------------------------------------------------|
 |                 |  QUARTER1  |  QUARTER2  |  QUARTER3  |  QUARTER4  |
 |-----------------+------------+------------+------------+------------|
 |Aggregate Growth | $13,916.00| $10,135.00| $20,073.00| $16,454.00|
 |-----------------+------------+------------+------------+------------|
 |Bond             | $13,272.00| $16,561.00| $33,390.00| $21,279.00|
 |-----------------+------------+------------+------------+------------|
 |Capital          |            |            |            |            |
 |Accumulation     | $12,291.00|  $9,422.00| $26,222.00| $25,191.00|
 |-----------------+------------+------------+------------+------------|
 |Cash Management  | $15,378.00| $12,083.00| $26,116.00| $20,166.00|
 |-----------------+------------+------------+------------+------------|
 |Government       |            |            |            |            |
 |Securities       | $12,982.00| $11,570.00| $24,694.00| $15,248.00|
 |-----------------+------------+------------+------------+------------|
 |Growth           |  $7,633.00| $10,892.00| $33,196.00| $14,645.0
 |-----------------+------------+------------+------------+------------|
 |High Yield       | $11,870.00| $13,895.00| $24,221.00| $18,255.
 |-----------------+------------+------------+------------+------------|
 |Tax Exempt       | $14,925.00| $14,757.00| $23,934.00|  $8,518
 |-----------------+------------+------------+------------+------------|
 |TOTAL RETURNS    |$102,267.00| $99,315.00|$211,846.00|$139,75
 ----------------------------------------------------------------------
```





**The SAS® System.
More Choices
for More Applications
than Any Other Software.**

And we'll give you a free demonstration.

It's taken a thousand programming years of effort to bring you this new class of software. And we think it's been time well spent.

Now see what you think. Give us a call today at (919) 677-8200 to arrange your free demonstration of the SAS System. In Canada, call (416) 443-9811.

You'll learn more about the world's first true applications software system — offering you a range of capabilities no other software can match. And backed by the industry's most complete technical support, consulting services, documentation, and training. All from SAS Institute Inc., one of the world's most respected names in software.

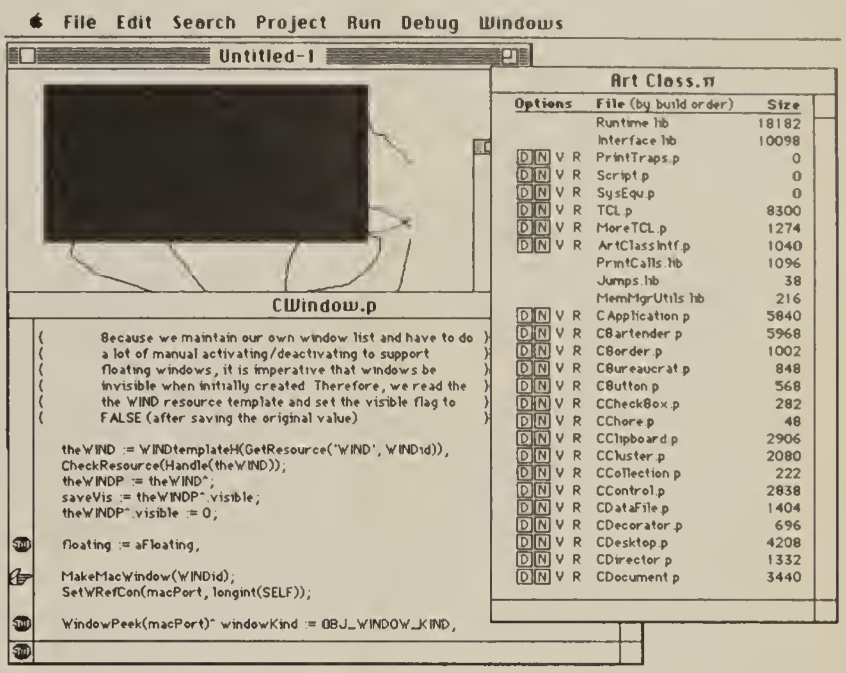
SAS Institute Inc.
Software Sales Department
SAS Circle □ Box 8000
Cary, NC 27512-8000
Phone (919) 677-8200
Fax (919) 677-8123

SAS and SYSTEM 2000 are registered trademarks of SAS Institute Inc., Cary, NC, USA.
MultiVendor Architecture is a trademark of SAS Institute Inc.
Other brand and product names are registered trademarks or trademarks of their respective holders.
Copyright © 1990 by SAS Institute Inc. Printed in the USA.

Ease + power = Think Pascal

Symantec's compiler is a bridge to object-oriented programming

REVIEW



```
{          Because we maintain our own window list and have to do  }
{          a lot of manual activating/deactivating to support       }
{          floating windows, it is imperative that windows be       }
{          invisible when initially created  Therefore, we read the }
{          the WIND resource template and set the visible flag to   }
{          FALSE (after saving the original value)                  }

    theWIND := WINDtemplateH(GetResource('WIND', WINDid)),
    CheckResource(Handle(theWIND));
    theWINDP := theWIND^;
    saveVis := theWINDP^.visible;
    theWINDP^.visible := 0;

    floating := aFloating,

    MakeMacWindow(WINDid);
    SetWRefCon(macPort, longint(SELF));

    WindowPeek(macPort)^ windowKind := OBJ_WINDOW_KIND,
```

```
Options     File (by build order)     Size
            Runtime lib              18182
            Interface lib            10098
D N V R     PrintTraps.p                 0
D N V R     Script.p                     0
D N V R     SysEqu.p                     0
D N V R     TCL.p                     8300
D N V R     MoreTCL.p                 1274
D N V R     ArtClassIntf.p            1040
            PrintCalls.lib            1096
            Jumps.lib                   38
            MemMgrUtils lib            216
D N V R     CApplication.p            5840
D N V R     CBartender.p              5968
D N V R     CBorder.p                 1002
D N V R     CBureaucrat.p              848
D N V R     CButton.p                  568
D N V R     CCheckBox.p                282
D N V R     CChore.p                    48
D N V R     CClipboard.p              2906
D N V R     CCluster.p                2080
D N V R     CCollection.p              222
D N V R     CControl.p                2838
D N V R     CDataFile.p               1404
D N V R     CDecorator.p               696
D N V R     CDesktop.p                4208
D N V R     CDirector.p               1332
D N V R     CDocument.p               3440
```

Symantec's Think Pascal *gives programmers an object-oriented environment for the Macintosh*

With the release of Version 3.0, Symantec Corp.'s Think Pascal programming development system for the Apple Computer, Inc. Macintosh fully embraces the ideas and methods associated with object-oriented programming.

Since the language is still Pascal, Think Pascal 3.0 can be used without the aid of its object-oriented programming element. As such, the program serves as a good bridge for old-time Pascal programmers who want to get their feet wet rather than plunge headfirst into object-oriented programming.

Version 3.0 builds on the concepts, tools, compiler, editor and debugger of Version 2.0. Like Version 2.0, it revolves around projects, the organizational metaphor for all Think programs.

Projects keep track of all the program source files, environmental files, library files and all the segments of a Pascal application. The Think Project window maintains information about each file, including whether or not it needs to be recompiled.

In Think Pascal, Pascal programs are written using a multiwindow text editor. The editor includes a "pretty printer" that automatically formats code as it is typed and catches many syntax errors.

The pretty printer is sophisticated enough to provide a choice of display formats, character formats, sizes and styles.

Think Pascal Version 3.0

Price: $249

- Performance: Excellent
- Documentation: Very good
- Ease of learning: Very good
- Ease of use: Very good
- Error handling: Very good
- Support: Satisfactory - Very good
- Value: Very good

The editor contains complete Find-and-Replace string commands that work across project files. The editor also includes commands that facilitate finding function definitions quickly.

Because Think Pascal 3.0 includes a traditional fast linker and a Pascal compiler, it can use source-code libraries from other systems, including Think C 3.0 and 4.0, Mac App, Macintosh Programmers' Workshop, Macintosh Pascal, Macintosh Development System and Programmers' Workshop object files.

It also works with the Mac tool box and operating system routines and Apple's Object Pascal and standard Apple numerics environment. Furthermore, Think Pascal 3.0 complies with the ANSI Pascal standard.

The Think Pascal class library comes with prewritten objects to implement everything in the standard Mac graphical user interface. The prebuilt objects allow incorporation of windows, menus, controls and palettes, plus special interface additions such as floating windows and tear-off menus.

Think Pascal 3.0's source-level debugger lets users set break points in the code, examine the contents of variables and change their values on the fly as the program is running.

It can also run the program one step at a time. Even complex objects and structured data types such as records and arrays can be examined.

The Think Pascal 3.0 compiler produces tight and efficient application code. According to Symantec, the compiler can compile 44,000 lines of code per minute on a Mac II.

The smart linker removes all the dead code, which in turn speeds up the execution of the final stand-alone application.

Think Pascal 3.0 comes with a user manual, a resource and utilities manual and a guide to object-oriented programming. Symantec also sells a separate on-line tutorial called Just Enough Pascal.

Think Pascal 3.0 is about as easy to learn as a Mac programming development system can be at the professional level. Anyone with Pascal experience on other platforms or experience with other languages on the Mac won't have any problem using it.

Error handling in a programming environment is important, since it is vital to keep track of programming problems as they crop up and to separate design and syntactical mistakes from failures of the environment itself. Think Pascal 3.0 does both jobs well.

Unfortunately, the program lacks the capability to continue compiling after errors have been detected.

Symantec provides unlimited (not toll-free) phone support. The technical staff handles questions quickly and precisely.

Think Pascal 3.0, which costs $249, has considerably more programming and development prowess than other personal object-oriented programming packages.

It is also well suited to developing Mac applications that have to take advantage of existing code libraries and programming skills.

Symantec Corp., 10201 Torre Ave., Cupertino, Calif. 95014-2132, 408-253-9600.

Dbfast

FROM PAGE 43

reads. It is possible to reread the current record from the disk, overwriting changes that have been made in memory, and remove the last appended record if it has not been committed to disk.

Although mainly a programming language, Dbfast Windows includes a no-frills editor and utilities for creating and maintaining database files, reports and labels. The editor allows up to four edit windows to open simultaneously. Window management options let you quickly switch between tiled and stacked views.

Dbfast Windows speeds the edit, compile and run cycles by automatically invoking the editor when errors are encountered if the debugging option is turned on. Users can invoke the compiler and run the resulting object code using the pull-down menus or hot keys. If there are any errors, Dbfast will open an edit window, position the cursor at the offending line and display the error description. By default, Dbfast compiles all external commands and procedures into one program limited to 32K bytes. Larger programs can be broken into chained 32K-byte segments.

The utilities menu lets users take care of programming-related tasks, such as file and report definition, from within Dbfast. The standard Create/Modify Structure procedure is implemented as a Dbase program and includes source code.

The label and report features are taken directly from Dbase. There is no access to field lists and no indication of how many columns of available space have been used. Dbfast also has no tool for screen design. Though character-based screen generators can be used, they will not handle Windows fonts.

The interactive command mode will execute or simulate most Dbase file maintenance commands such as data editing and Delete, List and Browse. Although many of the interactive commands are implemented, Dbfast Windows is not intended as a general-purpose interpreter. Variables, arrays and macros are not supported in command mode. There is no command history stack. Command mode is not compatible with the other options.

Graphics are supported as a field type and for screen displays, but the only graphic file format currently supported is the Windows Paint program bit-mapped file. The Set Graphic Input To command was designed to allow input from any device that will capture images, but the only device currently supported is the Windows clipboard.

The Dbfast Windows manual needs an update; many of the program's best features and commands are tucked away in a Read.me file. There is no on-line Help, and the index is not detailed enough. There is an introduction on how to program for the Windows interface and a section on error messages.

For users already familiar with the Dbase language, learning Dbfast Windows goes quickly. Installation involves only one disk and takes just a minute. Likewise, Dbfast Windows is quite easy to use, despite certain idiosyncrasies.

During interactive operations, warning messages always ask for confirmation before allowing users to delete a file or close a window without saving changes. Command-line mode is less safe: There is no confirmation prior to zapping a file.

Bumblebee Software offers 30 days of free (but not toll-free) telephone support, facsimile and a private electronic bulletin board as well as a 30-day money-back guarantee. Technicians are courteous and competent.

Dbfast Windows accomplishes well its stated goal of implementing the Dbase language under the Windows environment. At $395, it offers industry-standard Dbase data storage with a modern graphical user interface at a reasonable price.

Bumblebee Software, Inc., 4122 128th Ave. S.E., Bellevue, Wash. 98006, 206-562-1157.

Let CICS Manage Itself

Automate Your CICS Regions with AOEF

- Start, stop and recover CICS regions.
- Time initiate transactions, batch job support and CEMT commands.
- Monitor and correct terminal status.
- Trigger journal jobs on demand.
- Ship early problem warnings to consoles, TSOids and to the HELP desk.
- Respond to CICS's WTOs, WTORs, abends and log messages with MVS activities, predefined WTOR responses and corrective CEMT commands.

The CICS Automated Operations Extension Facility is a proven approach to system managed CICS resources. Call us today for more information or a trial for AOEF

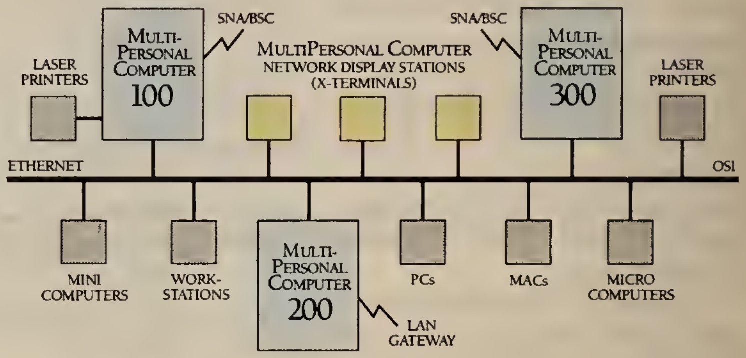
Netec International, Inc.
P.O. Box 180549 • Dallas, TX 75218
Telephone (214) 343-9744
FAX (214) 343-9009 • TLX 314419

Yes, it's just like your good old PC—familiar and easy to use. No, it's not like your good old PC—underpowered and short of memory, especially on a network. It's a MultiPersonal™ Computer from Motorola, and it has what you need.

For starters, raw power. With Motorola's high performance M88000® RISC microprocessor for speeds over 60 MIPS.

Next, UNIX® System V—the true multi-user, multi-tasking operating system. And X-Windows for transparent access to any resource on the network: Mainframes. Minis. Macs. LANs. PCs. Printers. Scanners. Or any combination thereof, simultaneously.

The high resolution Network Display Stations that come with a MultiPersonal computer make UNIX as graphical as it is powerful. And you don't need a degree in nuclear physics to operate a MultiPersonal Computer—only a little intuition, and some mouse-eye coordination for pointing and clicking on icons and windows.


LASER PRINTERS
MULTI-PERSONAL COMPUTER 100
SNA/BSC
MULTIPERSONAL COMPUTER NETWORK DISPLAY STATIONS (X-TERMINALS)
SNA/BSC
MULTI-PERSONAL COMPUTER 300
LASER PRINTERS
ETHERNET
OSI
MINI COMPUTERS
WORK-STATIONS
MULTI-PERSONAL COMPUTER 200
LAN GATEWAY
PCs
MACs
MICRO COMPUTERS

It Looks Like A PC.
It Feels Like A PC.
Thank Goodness It's Not.

MultiPersonal™ Computer

Network Computing With A Personal Touch™

88open

---

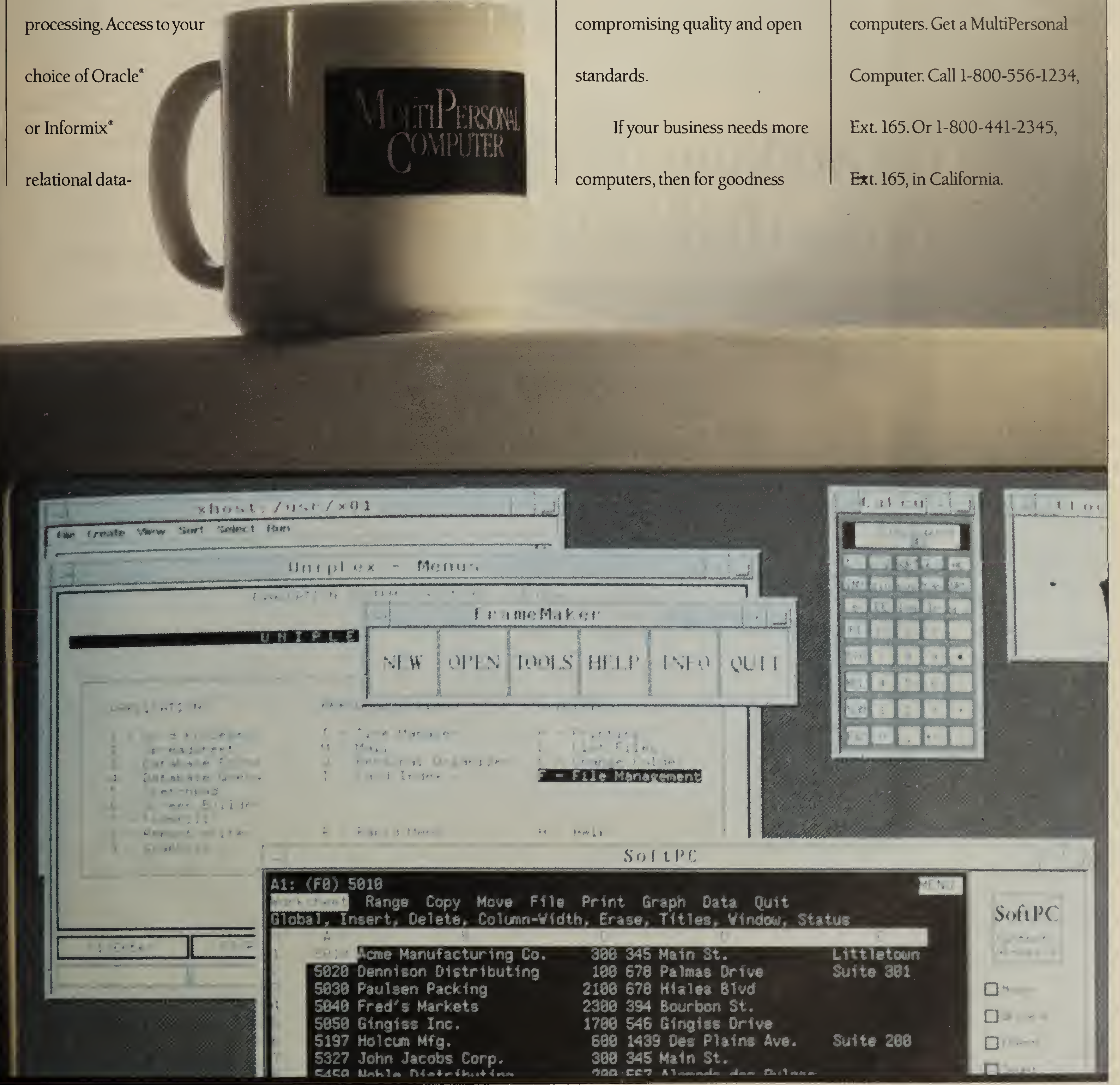
*MIPS stands for Millions of Instructions Per Second. © 1990 Motorola, Inc. Motorola Computer Group is a member of Motorola's General Systems Sector. Motorola, MultiPersonal, M88000, and the Motorola logo are trademarks or registered trademarks of Motorola, Inc. All other products or brand names listed are trademarks or registered trademarks of their respective holders.

A MultiPersonal Computer comes ready to roll, right out of the box. It comes complete with some of the best software in the business. Like the Uniplex™ office suite for spreadsheets and word processing. Access to your choice of Oracle® or Informix® relational databases. And FrameMaker™ corporate publishing. It even runs your PC DOS applications, without any additional hardware.

It's a big bundle, but it won't cost you one. In fact, you can't assemble a more capable collection of computers, for less. Period. And it's all backed by Motorola's commitment to uncompromising quality and open standards.

If your business needs more computers, then for goodness sake, get more than just personal computers. Get a MultiPersonal Computer. Call 1-800-556-1234, Ext. 165. Or 1-800-441-2345, Ext. 165, in California.

MultiPersonal Computers come in three sizes for workgroups from 2 to 64 stations. Plus a choice of 17-inch color, or 16- and 19-inch monochrome Network Display Stations. And system peripherals including laser printers, scanners, streaming tape and optical drives.



```
A1: (F0) 5010
    Range  Copy  Move  File  Print  Graph  Data  Quit
Global, Insert, Delete, Column-Width, Erase, Titles, Window, Status
     Acme Manufacturing Co.       300 345 Main St.          Littletown
5020 Dennison Distributing        100 678 Palmas Drive      Suite 301
5030 Paulsen Packing             2100 678 Hialea Blvd
5040 Fred's Markets              2300 394 Bourbon St.
5050 Gingiss Inc.                1700 546 Gingiss Drive
5197 Holcum Mfg.                  600 1439 Des Plains Ave.  Suite 200
5327 John Jacobs Corp.            300 345 Main St.
```

MOTOROLA
Computer Group

Miller

CONTINUED FROM PAGE 39

last year? Is the new computer used by our research assistant being backed up? What security do we have for payroll now that we are doing it on the computer?

Beyond that, the basics are actually fairly simple. First, it is important to back up the work somehow: preferably daily, at least weekly, certainly monthly and definitely sporadically. Second, at least have some kind of recovery program (Mace Utilities, Norton Utilities, PC Tools) that enables you to restore something you have accidentally erased.

However, before you start choosing the best packages for your situation, assess the potential for disaster in your area. Then figure out what kind of prevention and recovery is needed. Finally, plan for it.

Beyond somebody accidentally erasing your hard drive, there are various categories of disasters:

- The whole works goes down permanently. There is a fire, or a disgruntled employee wipes out all the data in the office.
- One or more of the machines go down or are stolen. Major damage may require time in the shop. How is it replaced? How long does it take to get repaired? How much is lost in employee downtime?
- The problem is temporary. An animal gets into the power transmitting station, and the whole neighborhood is blacked out for half a day. A bug freezes the system. Somebody kicks the plug of the surge protector out of the wall. You don't have a surge protector, and a power spike wipes out your hard drive. These can certainly disrupt a workday.

Viruses get the most publicity but probably do very little of the real damage. Much more damage has probably been done via the DOS commands "Erase *.*" and "Format," which lack fail-safe protection.

This is the age of service and information: Service means responding to requests for information. How badly affected is the work of the company when the technology fails?

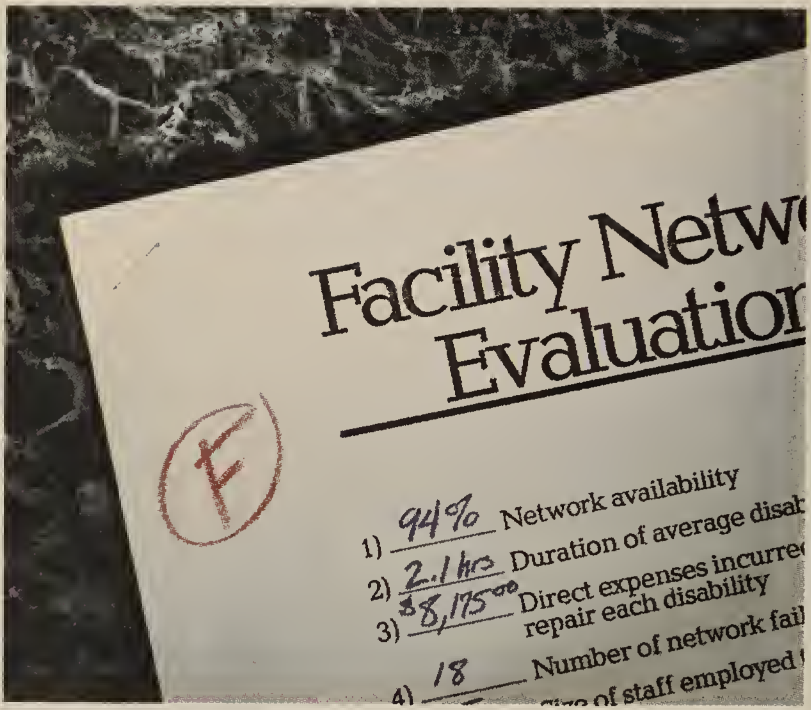
If an organization is prepared to meet the problems that can and will occur in the computer age, they should have answers to the following questions:

- Have you inventoried all your workstations, including the data and files within?
- Have you assessed the risks for each workstation, based on the importance to the company of the individual user's application?
- Have you considered the effect of downtime per workstation and the maximum time needed to get up and running again without seriously harming your operations?
- Have you considered the steps necessary to protect each workstation and the resulting cost/benefit ratios?
- Are you actually doing whatever you have already planned to do to back up data and otherwise secure your workstations?

If your organization can respond satisfactorily to each of these queries, you should feel justified in sleeping like a baby at night. If your response is, "I never really thought about that," then it's time to take action before it is too late.

Miller is principal of Emmy Miller Associates, Inc., a management consulting firm in Wynnewood, Pa.

In networking, we think 94% is a failing grade.



Facility Netw
Evaluation
F
1) 94% Network availability
2) 2.1 hrs Duration of average disab
3) $8,175.00 Direct expenses incurre
repair each disability
4) 18 Number of network fail
of staff employed

A recent study shows that in large corporations, the typical facility network only operates 94% of the time.

Which means, of course, that it's down 6% of the time.

6%. You wouldn't accept that from your phone company. Or your power company.

At Chipcom, we don't think you should accept it from your network, either.

Now, you don't have to. With Chipcom fault-tolerant networking, you have a network that never lets you down. A network that is:

Reliable—Not simple fault isolation. True fault tolerance for total network survivability.

Flexible—Repairs, additions, moves and changes can be done on the fly. Without taking the network down, and without user interruption.

Manageable—Not mere network monitoring. Real-time central control for interactive facility-wide network management.

Affordable—We can show you how a Chipcom fault-tolerant network will pay for itself many times over, and how you can add it incrementally to your present facility network.

For more information, call **1-800-228-9930**.

CHIPCOM
Fault-Tolerant Networking

OS/2 gets driver architecture

BY CHARLES VON SIMSON
CW STAFF

REDMOND, Wash. — Microsoft Corp. recently announced the availability of a software architecture, giving disk drive vendors a standard way to write OS/2 device drivers for a number of systems interfaces. The company said it expects the system to expand availability of disk drives for OS/2-based systems.

The layered device driver (Laddr) architecture is aimed primarily at providing a standard way for hardware vendors to write OS/2 device drivers for the small computer systems interface (SCSI). The system will also support a number of other interfaces, including Industry Standard Architecture, Extended Industry Standard Architecture and IBM Micro Channel Architecture.

"Laddr primarily addresses the difficulty in writing SCSI drivers for OS/2," said Nancy Lanning, a Microsoft OS/2 project manager. "The system will allow a dramatic reduction in lead time for writing the drivers, and we hope that will broadly increase the number and types of storage systems available."

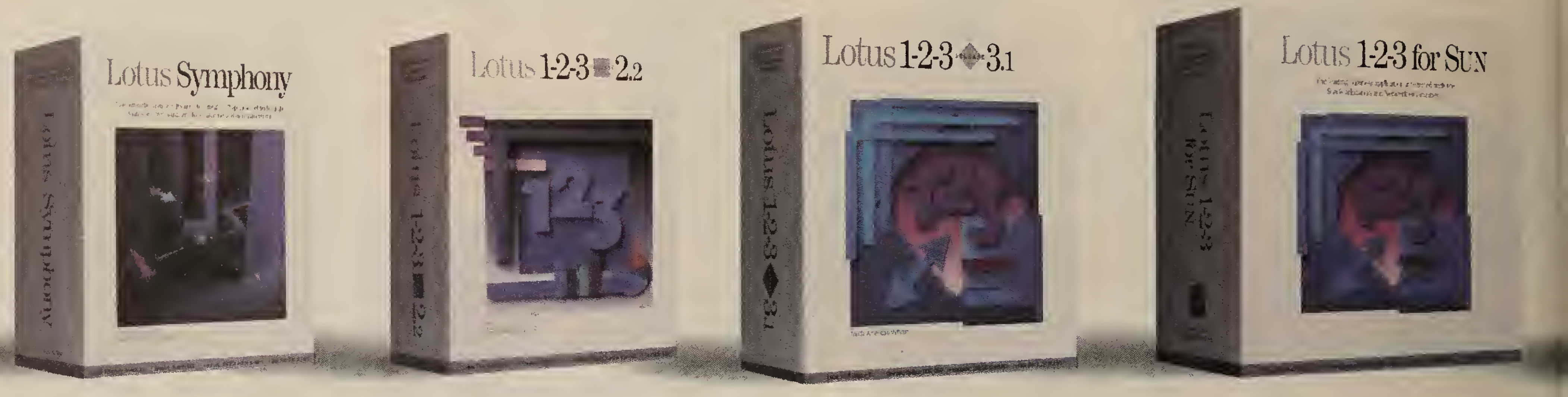
The layered software architecture will provide a standard device driver core connection between SCSI devices and OS/2. As a result, storage device vendors need only write code that is specific to their device. This may reduce the amount of code that vendors have to write by as much as 90%.

"By adding these capabilities, Microsoft is likely to significantly boost the market for SCSI products," said I. Dal Allen, chairman of the SCSI-2 Common Access Committee, a standards group. Allen said that because Microsoft has placed the technology in the public domain, without licensing requirements, it is likely to gain wide acceptance.

A lack of device drivers has been cited by Microsoft as an impediment to OS/2 acceptance.

When considering new computing technologies, remember the importance of compatibility.
Weigh the cost of retraining.
Bear in mind the investment you've made in your current systems. Don't overlook networking options.
Consult with experts and analysts.

Then do what



Introducing the Lotus

The complicated considerations that drive business computing decisions are suddenly a lot less complicated.

Because the Lotus® Spreadsheet Family now lets you use the industry-standard spreadsheet, 1-2-3,® on a wide range of hardware platforms and operating systems. So you can choose the most appropriate computing technology for any given task, without giving up the most advanced spreadsheet technology. And create an environment in which 1-2-3 users on platforms from desktop PCs to mainframes can work together. All while making the most of the investment you've made in Lotus spreadsheets up to now.

Each product in the Lotus Spreadsheet Family is designed to take full advantage of its specific platform. For PCs, 1-2-3 Release 2.2 and Symphony® 2.2 give you all-purpose spreadsheet capabilities that have become the industry standard. Soon-to-be-available 1-2-3 Release 3.1 provides 3D worksheets, WYSIWYG screen display, external data access and complete spreadsheet publishing.

1-2-3/G™ combines the power of 1-2-3 with a breakthrough graphical user interface designed for OS/2® and Presentation Manager.™ New 1-2-3 for UNIX* System V gives users the world's most popular spreadsheet, with new features designed to make the most of the UNIX System V/386 PC environment. And 1-2-3 for Sun allows

ever you want.

Spreadsheet Family.

you to exploit the powerful windowing, networking and multi-tasking capabilities of Sun workstations.

We've brought 1-2-3 to enterprise-wide computing systems, as well. 1-2-3 for VAX®/VMS® and 1-2-3 for ALL-IN-1® provide a vital link that lets Digital™ computers fully communicate with PCs in a DEC® network, using 1-2-3 as their common language.

And 1-2-3/M™ integrates all of the capabilities of 1-2-3 with IBM® System/370™ mainframes.

All of them are 1-2-3, with familiar commands that minimize retraining. And all are compatible, to open up totally new avenues of collaboration. Everyone throughout your company can share new and existing files, data, macros and customized applications. Regardless of the hardware involved. And work in an open, compatible spreadsheet environment company-wide.

And that means your decisions are not only easier to make. You can finally make them for the right reasons. Because instead of the trade-offs you've traditionally had to face, the Lotus Spreadsheet Family lets you focus on a single goal: how to work more productively, more efficiently, and just plain better.

And isn't that what computing is supposed to be all about in the first place?

Lotus

Lotus How the World Works.™

© 1990 Lotus Development Corporation. All rights reserved. Lotus, 1-2-3, and Symphony are registered trademarks and 1-2-3/G, 1-2-3/M and How The World Works are trademarks of Lotus Development Corporation. OS/2 and IBM are registered trademarks and Presentation Manager and System/370 are trademarks of International Business Machines Corporation. VAX, VMS, All-In-1, and DEC are registered trademarks and Digital is a trademark of Digital Equipment Corporation.
*UNIX is a registered trademark of American Telephone and Telegraph Company.

Laptop vendors expand portable PC boundaries

BY ELLIS BOOKER
and RICHARD PASTORE
CW STAFF

Laptop start-up Airis Computer Corp. announced last week a low-cost, lightweight notebook computer featuring a 12-plus hour battery designed to provide a leg up on the established competition. Airis is one of several companies extending the frontiers of laptop technology recently.

The VH-286, unveiled at PC Expo in New York, features a 640- by 480-pixel resolution, thin-film IBM Video Graphics Array (VGA) display, 2M bytes of memory, a 20M-byte hard drive and a 2,400 bit/sec. internal modem. The machine is powered by an Intel Corp. 12.5-MHz 80286 chip.

The laptop comes bundled with Traveling Software's Laplink, a communications program for desktop-to-laptop file transfers, and MS-DOS. Pricing for the unit, scheduled to begin shipping in September, is $1,899. Airis will distribute the laptop directly.

Aside from the minuscule price, battery life could be the VH-286's trump card. The computer uses either Nicad or alkaline batteries. The Nicad batteries are rated at six hours, while the alkaline option should yield substantially more than 12 hours of power. That is almost quadruple what other laptops currently offer.

Though the Chicago-based company faces tough competition from established players such as Compaq Computer Corp., Toshiba Corp. and Zenith Data Systems, there may be room in the market for "somebody to come in and undercut the major guys on price," said Bruce Stephen, an analyst at International Data Corp.

Meanwhile, Fremont, Calif.-based Grid Systems Corp. unveiled a notebook-size portable with a removable hard disk earlier this month.

COMPUADD Corp. this month became the latest manufacturer to introduce a VGA-equipped notebook.

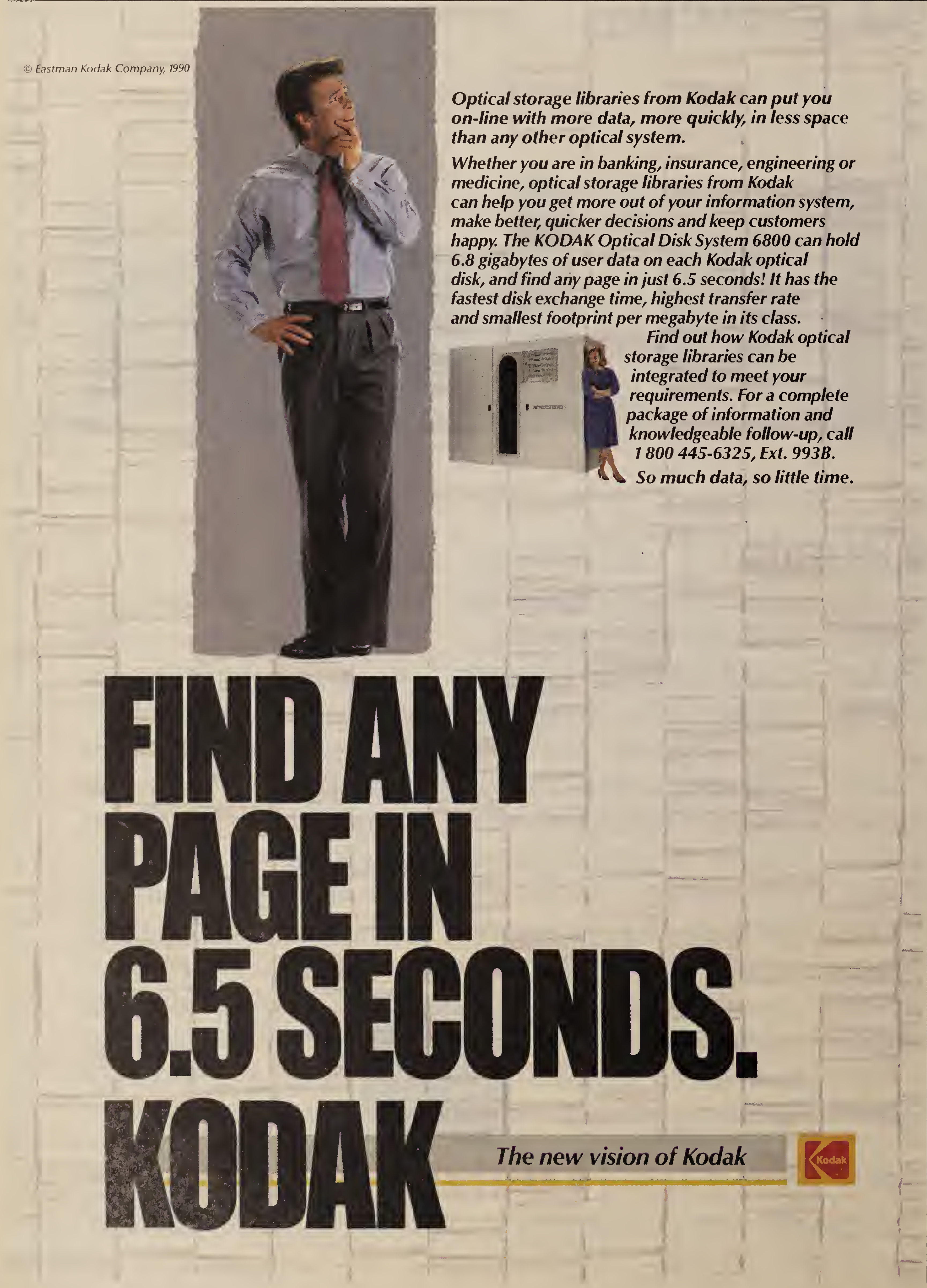
The six-pound Grid 1810 features a 20M-byte hard disk that can be removed and inserted into the Desktop Receiver, which can be plugged into Grid or Tandy Corp. desktop computers.

This feature is intended to facilitate the transfer of data between the portable and deskbound machines, according to Grid. The $2,895 notebook machine, slated to ship next month, also incorporates 1M byte of memory, a 10-MHz V-20 microprocessor, a two-hour battery and an IBM Enhanced Graphics Adapter display. The price for the Desktop Receiver has not been set.

Dolch Computer Systems in San Jose, Calif., announced earlier this month a VGA active matrix color display option for its AC-powered Intel 80386 and I486 portables. The Thin-Film Transistor LCD screen reportedly offers a contrast ratio of 100-to-1 vs. the conventional LCD ratio of 20-to-1. The $4,000 screen will ship in the third quarter, Dolch said.

Mail-order/retail-store vendor Compuadd Corp. this month became the latest manufacturer to introduce a VGA-equipped notebook. The $2,895 Companion is powered by a 12-MHz 286 and ships with 1M byte of memory and a 20M-byte hard disk. Companion will reportedly be delivered next month.

Zenith's venerable Minisport notebook PC got a midlife kicker earlier this month with the addition of a 20M-byte hard disk and IBM Color Graphics Adapter-level display. The Intel 8088-based Model 20 is available now and costs $2,799.


© Eastman Kodak Company, 1990

Optical storage libraries from Kodak can put you on-line with more data, more quickly, in less space than any other optical system.

Whether you are in banking, insurance, engineering or medicine, optical storage libraries from Kodak can help you get more out of your information system, make better, quicker decisions and keep customers happy. The KODAK Optical Disk System 6800 can hold 6.8 gigabytes of user data on each Kodak optical disk, and find any page in just 6.5 seconds! It has the fastest disk exchange time, highest transfer rate and smallest footprint per megabyte in its class.

Find out how Kodak optical storage libraries can be integrated to meet your requirements. For a complete package of information and knowledgeable follow-up, call 1 800 445-6325, Ext. 993B.

So much data, so little time.

FIND ANY PAGE IN 6.5 SECONDS.

KODAK

The new vision of Kodak

Vendors keep up with the Joneses at Comdex

BY RICHARD PASTORE
CW STAFF

Unlike Spring/Comdex '89, which showcased leading-edge technologies such as Intel Corp.'s new I486, this season's show brought little innovation. Instead, vendors trotted out a lot of me-too products, according to observers who attended the Atlanta event earlier this month.

"It wasn't much of a show compared to other Comdexes," said George Thompson, an analyst at Datapro Research Corp. in Delran, N.J. "It was not real exciting."

The majority of the me-too announcements were introduced in the hot-selling 386SX category. Intel's 80386SX microprocessor is moving so quickly that it reportedly accounts for 40% of total chip shipments.

Wyse Technology, Inc. introduced a personal computer based on the 16-MHz 386SX. The WY-3116SX is being positioned as Wyse's entry-level SX box intended for use in office applications, desktop publishing and small multiuser and mainframe gateway applications.

The base unit costs $1,799, while a 40M-byte hard disk model costs $2,499. The machine is available immediately from the San Jose, Calif., firm.

Easydata Computer Products, a Mountain View, Calif., clone maker, announced an SX model priced at $1,499. The 16-MHz box ships with 2M bytes of memory, expandable to 8M bytes, and a floppy disk drive.

Leading Edge Products, Inc. in Westboro, Mass., unveiled its first SX PC based on IBM's Micro Channel Architecture. The D3/MC ships with 1M byte of memory. The $1,995 base price inflates to $2,995 and $3,495 when a 40M-byte or 100M-byte hard disk is added.

San Jose, Calif.-based **Televideo Systems, Inc.** announced a 386SX-based diskless workstation intended for use as a network node. The unit comes with an Ethernet network interface board and Novell, Inc. Netware-compatible remote boot capability. The TS5 Telestation's 1M byte of memory is expandable to 4M bytes without an add-on board. The $2,480 price includes an IBM Video Graphics Array color monitor.

Hyosung Computer & Information Systems introduced its Maxar 386SX-40, a 16-MHz machine that features two floppy disk drives and a 40M-byte hard disk. With three expansion slots, 2M bytes of memory and one year's on-site service, the PC costs $2,495.

Both an SX-based desktop and laptop unit debuted from **Acer America Corp.** The desktop 1120SX runs on a 16-MHz 386SX chip and is targeted for desktop publishing, office automation and low-end file-server applications.

The 1100LX portable uses the same processor, offers a 40M-byte hard disk and one 3½-in. floppy disk drive. The unit weighs 13.2 pounds including battery pack, which provides 2½ hours of life, the San Jose, Calif., company said. The machines are scheduled to ship this fall. Pricing has not yet been determined.

Another SX portable was introduced by St. Paul, Minn.-based **Zeos International Ltd.** The 16-MHz machine incorporates a 42M-byte hard drive and floppy drive, as well as a gas plasma display. With 1M byte of memory, the 12-pound portable costs $2,195.

Graphical

CONTINUED FROM PAGE 39

terface completed 58% more work in the same amount of time as those using a character interface.

However, outside the above category, the results for graphical interface users were only marginally better than those for users of a character interface. Of the seven categories tested and quantified for experienced and novice users, there was only a statistically significant difference between graphical interface and character interface users in four experienced and two novice categories.

Potential participants were screened to form groups of 60 novice and 60 experienced users. Each group was split in half randomly, with 30 participants using a graphical interface and 30 using a character-based system. Each group was given a series of clinical tests, such as time required to complete a task, and attitudinal tests, such as describing their level of frustration in learning a new application.

Microsoft defended the gains as solid. "We didn't expect to show gains in all areas," said Ruth Ann Lorentzen, Microsoft Windows 3.0 marketing manager in charge of Microsoft's involvement in the study.

The study does not attempt to quantify issues such as speed or effectiveness of decision-making, and instead focuses on how quickly or with how many errors users could complete a series of word processing and spreadsheet tasks.

The strongest gains were made by experienced graphical interface users, who completed 35% more tasks and made 17% fewer errors than experienced users working with character-based applications. In the two areas of statistical significance, novice graphical interface users worked marginally faster and reported lower frustration than users working with character systems.

Lotus 1-2-3/M helps people combine their efforts instead of duplicating them.

Lotus® 1-2-3® has given people throughout your organization a more productive way to use their PCs. But they've never been able to fully exploit the advantages of working together. Because they've lacked the one application that could connect their PCs and unite them with the resources of the mainframe.

Presenting Lotus 1-2-3/M™—the Hub of Enterprise Spreadsheet Computing. Now everyone in your organization can work together building 1-2-3 applications that can span your entire enterprise.

In a partnership between IBM and Lotus, 1-2-3/M has been designed specifically to take full advantage of the power and networking capabilities of the System/370™ environment. So data from PCs and the mainframe can be consolidated into a master spreadsheet, whether people are working next door or around the world.

The DataLens™ architecture of 1-2-3/M provides direct access to both DB2™ and SQL/DS. Users can query and retrieve data directly into their worksheets, without having to learn a database language. What's more, with The Lotus Spreadsheet Connection, information can easily be exchanged between PCs and the mainframe.

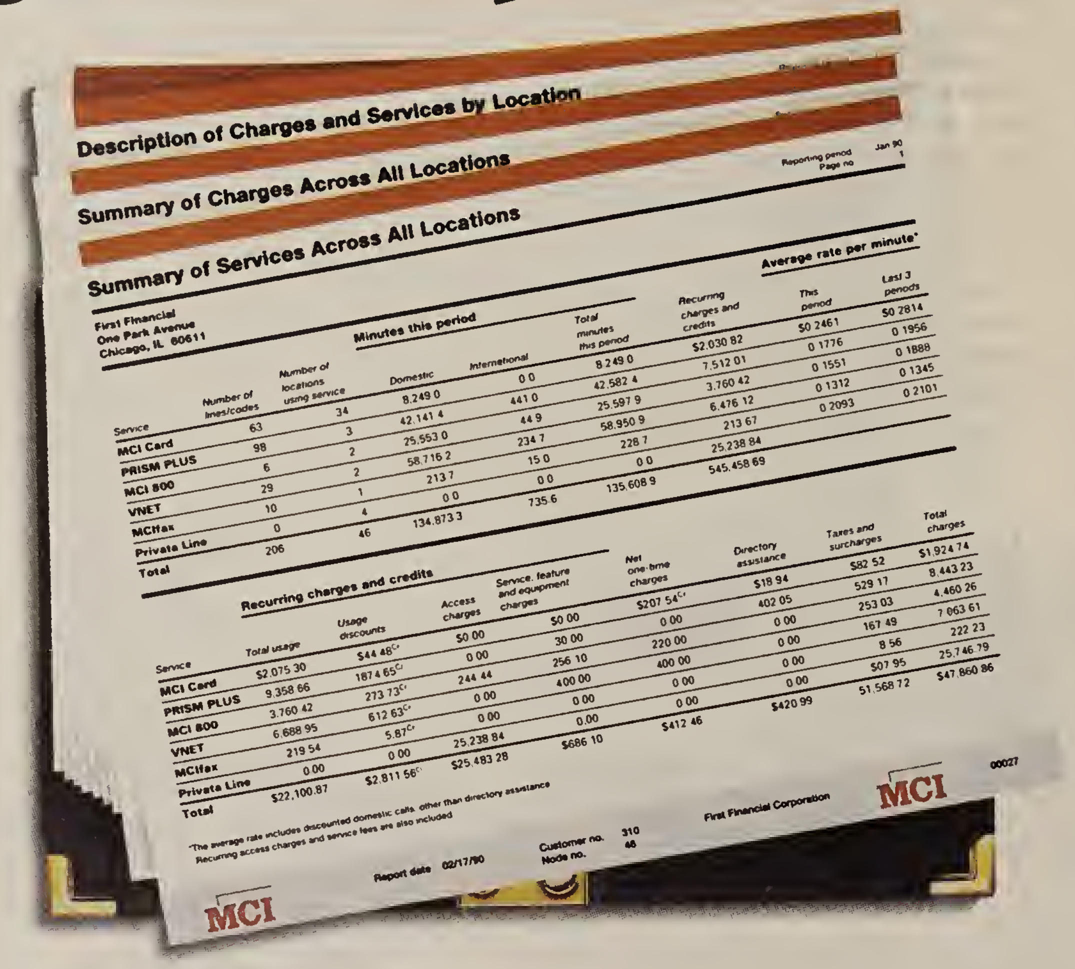
And 1-2-3/M isn't merely like 1-2-3. It *is* 1-2-3. That means your current investment is protected, because it offers application portability and full file compatibility with previous and current releases of 1-2-3. And applications developed on the PC will also run on the mainframe, including formulas and macros. So your people can get to work right away.

For more information, call your IBM Marketing Representative or **1-800-343-5414,** at extension CBK-0103. After all, people work better once they're able to work together.

Introducing Lotus 1-2-3/M

© 1990 Lotus Development Corporation. All rights reserved. Lotus and 1-2-3 are registered trademarks and 1-2-3/M and DataLens are trademarks of Lotus Development Corporation. IBM and the IBM logo are registered trademarks. System/370 and DB2 are trademarks of International Business Machines Corporation.

Introducing the telecommunications management report so advanced



Description of Charges and Services by Location

Summary of Charges Across All Locations

Summary of Services Across All Locations

Reporting period Jan 90
Page no 1

First Financial
One Park Avenue
Chicago, IL 60611

Service	Number of lines/codes	Number of locations using service	Minutes this period: Domestic	Minutes this period: International	Total minutes this period	Recurring charges and credits	Average rate per minute*: This period	Average rate per minute*: Last 3 periods
MCI Card	63	34	8,249.0	0.0	8,249.0	$2,030.82	$0.2461	$0.2814
PRISM PLUS	98	3	42,141.4	441.0	42,582.4	7,512.01	0.1776	0.1956
MCI 800	6	2	25,553.0	44.9	25,597.9	3,760.42	0.1551	0.1888
VNET	29	2	58,716.2	234.7	58,950.9	6,476.12	0.1312	0.1345
MCIfax	10	1	213.7	15.0	228.7	213.67	0.2093	0.2101
Private Line	0	4	0.0	0.0	0.0	25,238.84		
Total	206	46	134,873.3	735.6	135,608.9	545,458.69		

Service	Recurring charges and credits: Total usage	Usage discounts	Access charges	Service, feature and equipment charges	Net one-time charges	Directory assistance	Taxes and surcharges	Total charges
MCI Card	$2,075.30	$44.48 Cr	$0.00	$0.00	$207.54 Cr	$18.94	$82.52	$1,924.74
PRISM PLUS	9,358.66	187.65 Cr	0.00	30.00	0.00	402.05	529.17	8,443.23
MCI 800	3,760.42	273.73 Cr	244.44	256.10	220.00	0.00	253.03	4,460.26
VNET	6,688.95	612.63 Cr	0.00	400.00	400.00	0.00	167.49	7,063.61
MCIfax	219.54	5.87 Cr	0.00	0.00	0.00	0.00	8.56	222.23
Private Line	0.00	0.00	25,238.84	0.00	0.00	0.00	507.95	25,746.79
Total	$22,100.87	$2,811.56 Cr	$25,483.28	$686.10	$412.46	$420.99	51,568.72	$47,860.86

*The average rate includes discounted domestic calls, other than directory assistance
Recurring access charges and service fees are also included

Report date 02/17/90
Customer no. 310
Node no. 46
First Financial Corporation
MCI
00027

MCI

it deserves the world's most advanced demonstration.

Call, fax or send for your free demonstration disk.

If you're tired of sifting through endless phone bills from all your locations, you need MCI Portfolio.℠

Our free demonstration disk shows why Portfolio is the most comprehensive telecommunications management report available today.

Portfolio integrates the information you need from a wide range of MCI® services and from all your locations into a single, concise report. It lets you develop a completely individualized reporting format that mirrors your company's structure. Now you can tailor your report to meet corporate, divisional and branch office needs.

See why better telecommunications reporting means better cost control for your whole company.

Call 1-800-765-0088, fax 1-800-753-0088

MCI®
Let us show you.®

☐ Yes! Please send me my free MCI Portfolio demonstration disk.

Name____________________
(Please Print)

Address____________________

City__________ State______ Zip______

Business Phone Number (_____)__________

Average monthly phone bill________________

Mail to: MCI PORTFOLIO DISK, 230 Schilling Plaza South
3rd Floor, Hunt Valley, Maryland 21031

© MCI Communications Corporation, 1990.

NETWORKING

COMMENTARY

Thomas Nolle

Networks for the little guy

"The problem with selling to the Fortune 500," a marketing manager at a leading-edge digital communications vendor stated, "is that there's only 500 of them." This seemingly obvious point may be at the heart of networking vendors' continuing inability to address the average user's needs, because they are too intent on meeting the demands of the financial, investment and retailing giants that have the biggest communications budgets.

During the past two years, there have been some indications that changes could be afoot to make digital services more populist in nature and thus tap the far larger market below the Fortune 500. This attempt, however, has run afoul because of two major biases in the marketplace — biases that must be corrected in some way if we are to broaden our base of digital network users and keep the T1 market surge of the late 1980s alive.

When fractional T1 service was introduced in early 1989, it was hailed as a means of bringing the economies of scale offered by T1 to the more typical telecommunications user. Companies whose traffic levels were

Continued on page 60

Beam me up, Rutgers says

Rutgers' research center uses lasers for interim LAN interconnection

ON SITE

BY JOANIE M. WEXLER
CW STAFF

NEW BRUNSWICK, N.J. — Rutgers University really didn't feel like waiting six months to install cable conduits when it decided to interconnect its Ethernet local-area networks. So it took interim measures akin to those used aboard the starship *USS Enterprise*: It beamed the data between LANs with lasers.

In the meantime, the conduit-digging bulldozers chugged along at their leisure.

The Computer Aids for Industrial Productivity (CAIP) Center at the Rutgers-New Brunswick campus is using the Lace L00-18 system from Laser Communications, Inc. in Lancaster, Pa., as an interim LAN interconnection solution while its fiber backbone is put into place one segment at a time.

The system can simply be picked up and moved to where the Ethernet-to-Ethernet connection is needed, as long as there is a line-of-sight path between the two locations and the distance does not exceed 1km.

The less than three-hour installation time also makes the system handy for quick backup when conduits are accidentally cut, according to Stephen Carter, manager of computer facilities at the CAIP Center.

The $14,190 L00-18 consists of a pair of transponders, which are generally mounted on rooftops. At each network location, a transponder connects to a bridge or repeater via Ethernet transceiver cable. Each transponder sends a 20-milliwatt gallium aluminum arsenide laser through the air at full 10M bit/sec. Ethernet speed to its mate at the receiving location.

Carter conceded that his first choice of a transmission medium would always be fiber. "But having to cross a city street and being unable to get a right of way is a major deterrent to fiber that makes the laser system attractive," he said.

For short distances, Carter said, the Lace system is preferable to microwave because "just about any maintenance person can install a new unit; it's much easier than microwave to align."

Carter noted that some customers keep an extra pair of the transponders on hand for the same point-to-point link as a safety measure. He added that "there's no master/slave situation with the equipment, so you could also just buy a third unit and swap it in during a failure."

Rutgers served as a beta-test site before buying the system nearly one year ago. Carter said he has found the system to equal between 90% and 95% of the reliability of coaxial cable, Ethernet's standard medium — even in heavy fog, smog and snow, laser's biggest foes.

Unlike microwave transmissions, lasers do not require Federal Communications Commission licensing. Though short-range microwave licenses can be obtained fairly quickly, Carter noted, there are not always frequencies available in crowded urban areas.

The CAIP Center is involved in advanced research on parallel processing and machine vision — a technique whereby sensing equipment, such as a video camera, allows a computer to "see" an object and process it.

For example, the CAIP Center is currently working on an automated system for inspecting the ingredients in plastic containers and determining how to properly sort them for recycling.

The images are generally collected on one system and processed elsewhere on the network. Carter said high-end graphics workstations run programs that require immense speeds, so maintaining channel speed over the inter-Ethernet links is an advantage.

Melting pot

The research at the CAIP Center involves networking parallel processors from BBN Advanced Computers, Inc., Concurrent Computer Corp., Intel Corp., NCube and Pyramid Technology Corp. with two Stardent Computer Corp. Titan graphics workstations, 50 Sun Microsystems, Inc. and 10 Tektronix, Inc. workstations and 30 IBM Personal Computer AT-compatibles over three Ethernets.

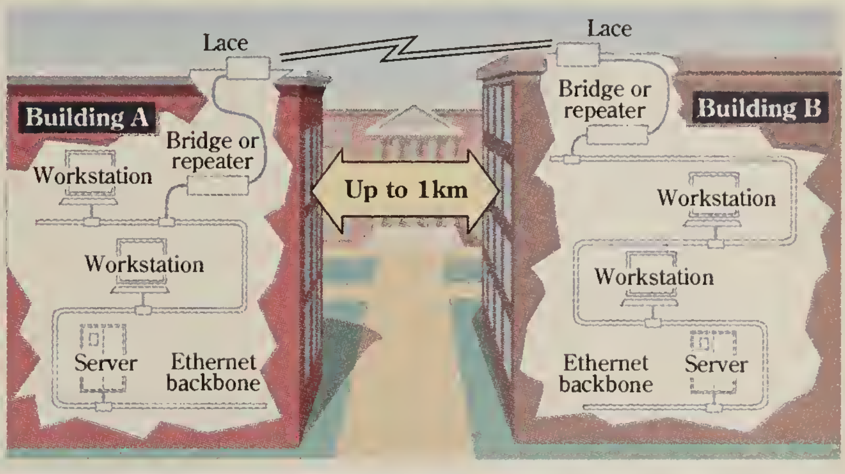
The university as a whole operates more than 150 Ethernets, Carter said.

While lasers can harm the retina of the human eye, Lace's line-of-sight requirement has most of them mounted on rooftops or other unlikely human haunts.

According to Michael Berman, vice-president of marketing at Laser Communications, a person would have to stare into the laser with a completely open eye for 10 seconds at a distance of closer than 50 feet to be harmed.

Laser LAN

Wireless LAN-to-LAN communications at Rutgers University is carried out via quickly installed, portable laser links



CW Chart: Paul Mock

New Version!

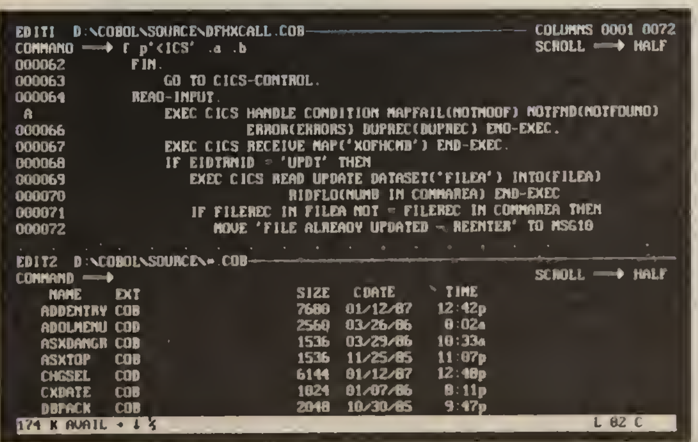
Zero Learning Curve

SPF/PC® 2.1

The MVS programmer will feel right at home using SPF/PC, the only PC editor functionally equivalent to editing on the IBM mainframe with ISPF/PDF, Release 2, Version 2.

SPF/PC fills the mainframe user's needs with a familiar environment, commands, large file support and micro-to-mainframe file portability. SPF/PC also offers:

- *true split screen*
- *command stacking*
- *43-line EGA*
- *picture strings*
- *online help*
- *binary editing*
- *directory/member lists*
- *hexadecimal editing*
- *50-line VGA*
- *user interface*
- *utilities*
- *network support*



```
EDIT1  D:\COBOL\SOURCE\DFHXCALL.COB─────────────────── COLUMNS 0001 0072
COMMAND ──→ f p'<ICS' .a .b                              SCROLL ──→ HALF
000062        FIN.
000063            GO TO CICS-CONTROL.
000064        READ-INPUT.
 A                EXEC CICS HANDLE CONDITION MAPFAIL(NOTMOOF) NOTFND(NOTFOUND)
000066                      ERROR(ERRORS) DUPREC(DUPREC) END-EXEC.
000067            EXEC CICS RECEIVE MAP('XOFHCMD') END-EXEC.
000068            IF EIDTRMID = 'UPDT' THEN
000069               EXEC CICS READ UPDATE DATASET('FILEA') INTO(FILEA)
000070                           RIDFLO(NUMB IN COMMAREA) END-EXEC
000071               IF FILEREC IN FILEA NOT = FILEREC IN COMMAREA THEN
000072                  MOVE 'FILE ALREADY UPDATED - REENTER' TO MSG10

EDIT2  D:\COBOL\SOURCE\*.COB────────────────────────────────────────────
COMMAND ──→                                              SCROLL ──→ HALF
   NAME     EXT                      SIZE   CDATE      TIME
   ADDENTRY COB                      7680  01/12/87   12:42p
   ADDLMENU COB                      2560  03/26/86    8:02a
   ASXDANGR COB                      1536  03/29/86   10:33a
   ASXTOP   COB                      1536  11/25/85   11:07p
   CHGSEL   COB                      6144  01/12/87   12:40p
   CXDATE   COB                      1024  01/07/86    8:11p
   DBPACK   COB                      2048  10/30/85    9:47p
174 K AVAIL • ↓ ½                                            L 02 C
```

SPF/PC includes many PC-productivity features to save time and keystrokes, such as direct access to BROWSE and EDIT directory lists from the DOS prompt.

Want proof? Ask us for a FREE, interactive demonstration diskette.

SPF/PC — so much like the real thing, you'll forget you're editing on a PC.

CTC®

Command Technology Corporation

1040 Marina Village Pkwy, Alameda, CA 94501 (415) 521-5900
Orders: (800) 336-3320 *FAX:* (415) 521-0369 *Telex:* 509330 CTC

Vendors to support IBM-to-TCP/IP networks

BY ELISABETH HORWITT
CW STAFF

SANTA CLARA, Calif. — Building on IBM's slowly expanding support of Transmission Control Protocol/Internet Protocol (TCP/IP) networking, three vendors have been introducing connectivity platforms designed to address a wide range of TCP/IP-to-IBM Systems Network Architecture (SNA) and local- to wide-area network connectivity needs.

The most recent entry into this field, Peer Networks, Inc., has introduced Peer Network Computer, a proprietary hardware platform that is said to act as a combination protocol converter, network applications processor and packet switch. The initial version, which is scheduled for release in August, will support X.25, TCP/IP and SNA protocols such as IBM 3270 emulation and the LU6.2 and PU2.1 peer-to-peer networking protocols, the vendor said.

US West is evaluating Peer Network Computer, along with products from vendors such as Intel Corp. subsidiary Jupiter Technology, Inc., NCR Comten and Unisys Corp., as the basis for a corporatewide data network that will connect a variety of Unix workstations and IBM hosts, according to Terry Murrow, a technical staff member of the regional holding company's advanced technology group.

US WEST wants TCP/IP to be used to interconnect not only Unix workstations and LANs but also Unix and SNA environments over remote links.

An ordinary 3270 emulation LAN gateway will not do for this job, Murrow said, because US West wants TCP/IP to be used to interconnect not only Unix workstations and LANs but also Unix and SNA environments over remote links.

US West wants "to transition from a synchronous transport wide-area network to TCP/IP" and eventually Open Systems Interconnect (OSI) protocols as part of its long-term strategy of "getting away from master/slave hierarchy to peer-to-peer architecture" and to a client/server configuration with which "multiple hosts can be accessed as actual servers on the LAN," Murrow said.

A recent introduction from Jupiter could address US West's long-term needs. The company announced software packages that, in combination with its channel-attached 9770 Network Protocol Server, are said to allow IBM System/370 hosts to act as high-speed file servers on TCP/IP networks using Sun Microsystems, Inc.'s Network File System (NFS) protocol.

The 9770 TCPaccess software is said to implement TCP/IP networking protocols, including Telnet and File Transfer Protocol (FTP), on System/370s running MVS and starts at $33,500. The 9770 NFSaccess package, which starts at $11,500, is said to implement NFS on System/370s. Jupiter's 9770 Network Protocol Server works in concert with the communications software to enable workstations on up to six Ethernet LANs to access files on the IBM mainframe, using NFS and TCP/IP protocols, the vendor said.

A third vendor, McData Corp. in Broomfield, Colo., announced TCP/IP support for its Linkmaster 6100E Ethernet-to-SNA channel server. The software, which is priced at $5,000, is said to allow Unix systems attached to TCP/IP terminal servers on an Ethernet LAN to access 3270 applications on an IBM host. FTP support is included in the software, McData said.

The burgeoning bevy of hardware platforms that users can configure to link various LAN, host and WAN environments directly addresses users "who have three or four different versions of LANs in a single installation and want to connect to the mainframe for [electronic] mail and database access," said Norman Weizer, a senior analyst at Arthur D. Little, Inc. As information systems groups attempt to take control of such networks, support of IBM's Netview will be a key feature for such platforms, he added.

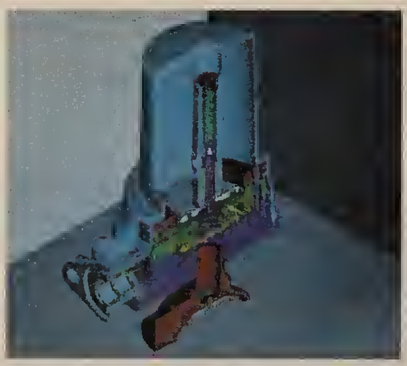
Peer Networks' product will offer both a direct link to Netview and support of the OSI Common Management Information Protocol when it ships in August, said Walter Fischer, vice-president of marketing. McData's platform is also said to communicate with Netview directly. Jupiter does not currently provide a Netview link.

Peer Network Computer's architecture consists of a high-speed bus linking multiprocessor boards, each of which can handle one or more network protocols, according to Fischer. In addition, he said, the platform can provide local processing of network applications. For example, it can back up transactions on a local disk in case some are lost in a network failure or validate transactions locally, minimizing the need to connect to remote hosts.

A typical Peer Networks platform configuration, including SNA software and two function boards, will cost about $45,000.

The IBM RISC System/
Designing on any other workstation

Whatever you're creating, you'll sail into a whole new age with any of the four POWERstations in the RISC System/6000 family. Because POWER (Performance Optimization With Enhanced RISC) processing can give you performance you've probably only dreamed about:



up to four instructions per machine cycle, 42 MIPS and 13 MFLOPS. Suddenly, complex designs don't take eons anymore.

The four RISC System/6000 POWERstations feature a range of graphics processors from grayscale to Supergraphics to satisfy any graphics demand. Great news for Power Seekers working on animation, scientific visualization, medical imaging and engineering solutions like CADAM,™ CAEDS™ and CATIA.™ And for electrical design automation, there's IBM's all new CBDS™ and an arsenal of over 60 EDA appli-

IBM is a registered trademark and RISC System/6000 and CAEDS are trademarks of International Business Machines Corporation. CADAM is a trademark of CADAM INC. CATIA is a trademark of Dassault Systèmes. CBDS is a trademark of Bell Northern Research Corporation.
HAGAR THE HORRIBLE Character(s) © 1990 King Features Syndicate, Inc. © IBM Corp. 1990, all rights reserved.

FDDI eyes standard net managers

BY JOANIE M. WEXLER
CW STAFF

While the general condition of LAN management may be "deplorable," according to market research firm Forrester Research, Inc., the SMT Development Forum's efforts continue to help shape the Fiber Distributed Data Interface (FDDI) local-area network into the most inherently manageable LAN in town.

The vendor/user consortium, which met last week at the American National Standards Institute (ANSI) FDDI standards committee meeting, is assisting efforts to build a management information base to allow FDDI LANs to be managed by standard network management protocols, such as Simple Network Management Protocol (SNMP), Open Systems Interconnect (OSI) and IBM's Netview.

Currently, no such management information base exists for FDDI. Users are generally using proprietary network management systems from their FDDI vendors or not managing their FDDI networks at all.

The forum — which this month gained AT&T Microelectronics and 3Com Corp. as member companies — is also working on a model for allowing one station on an FDDI ring to "speak" both Station Management (SMT) and an enterprise network management system protocol such as SNMP, OSI or Netview.

The designated station would collect management information from every FDDI node via SMT and communicate it up to the enterprise system via the other protocol, said Bruce McClure, president of North Billerica, Mass.-based Synernetics, Inc., which founded the SMT Development Forum last fall.

Products based on the model could benefit users with heterogeneous FDDI networks in which stations may not all contain the same network management agent.

Only the management station would be required to run the higher level network management software, polling the FDDI stations using SMT.

The SMT Development Forum was founded to help push specifications through the ANSI FDDI standards committee for mandating the management of an entire FDDI ring at its physical and media access-control levels — the only layers of the OSI model addressed by the FDDI standard.

The forum's specifications were indeed added to the standard at the committee's April meeting. FDDI — a 100M bit/sec. token-ring network that runs over fiber — is the first LAN to have network management capabilities built in.

The FDDI standard requires the SMT component to distribute network management capabilities to all stations on the LAN, regardless of equipment type and vendor, data protocols and application environments.

Mary Modahl, an analyst at Forrester Research, supported the idea of added physical-layer management for LANs.

"Most users have to rely on the administrative package that comes with the network operating system," she said. "They need a more complete system that addresses physical and systems management."

Opponents of the forum's approach, however, argued that since FDDI — of which SMT is the "brainlike" component — addresses only the first 1½ layers of the OSI model, there remains the question of how to manage the higher layers in the FDDI network and interconnected FDDI networks.

This function could otherwise be accomplished by using the same network management agent — SNMP, OSI, Netview, etc. — in each intelligent device.

FDDI-II: The Sequel

Just when you thought it was safe to stop using the word *emerging* to describe the state of FDDI LANs, FDDI-II has reared its head.

FDDI-II will allow users to send a mix of packetized data, video and voice traffic over the 100M bit/sec., ring-shaped fiber-based LAN, said Bruce McClure, president of Synernetics, Inc. The firm founded the SMT Development Forum, an organization devoted to interoperable FDDI LAN management, last fall. Now the group is tackling the new services necessary to manage an FDDI-II network.

FDDI-II will allow users to dynamically allocate 16 wideband FDDI channels for packetized and isochronous transmissions (traffic that has been synchronized to a real-time clock). The isochronous capabilities are necessary for sending digitized voice and video traffic packets, which must arrive in real time and in the proper order to be meaningful.

FDDI-II has been under development by the American National Standards Institute FDDI standards committee since 1986, and McClure said the technology should see "significant development in the next two years."

JOANIE M. WEXLER

6000™ family.
will seem downright primitive.

cations from more than a dozen vendors.

With every POWERstation, you can get an almost unimaginable palette of 16 million colors, which gives you 3D images so realistic, they fairly leap off the screen, with super sharp resolution of 1,280x1,024 pixels. And when it's time to call in the heavy artillery, the POWERstation 730 draws nearly one million 3D vectors per second. Like all POWERstations, it can come complete with its own graphics processor, freeing the POWER processor to rapidly create and analyze your designs. All at prices that won't sink anybody's budget.

So if you're tired of paddling upstream with yesterday's performance, call your IBM marketing representative or Business Partner to find out more about the RISC System/6000 family. For literature, call 1 800 IBM-6676, ext. 991.

Civilization never looked so good.

For the Power Seeker.

IBM

Nolle

CONTINUED FROM PAGE 57

not high enough to justify a full 1.5M bit/sec. T1 link traditionally had to pay a high price for individual 64K bit/sec. DS0 lines. Fractional services allow such users to pay a bulk rate, similar to that offered for T1, without having to purchase full T1. A single DS0 from a fractional T1 interexchange service costs about the same as a voice-grade private line. Can't afford full T1? Buy chunks of it instead.

This doctrine has suffered some early setbacks. While there are many users with enough traffic to justify a three- or four-DS0 fractional T1 link at the interexchange level, local access and customer premises equipment (CPE) costs are often too high for them. Studies of fractional T1 costs, considering all elements, show that over one-half of the potential savings of a typical application can be dissipated by such costs.

Fortunately, vendors have begun downsizing their products to address the low end of the market. CASE/Datatel has been doing relatively well with its low-end T1 multiplexer this year, during a period in which other vendors have been less effective. AT&T has just announced a 5000 series T1 multiplexer with a $6,000 entry cost — about half the cost of the prior low-end model.

In addition, local exchange carriers are casting about for ways to lower access charges for fractional T1 without arousing the ire of state public utility commissions that fear residential costs could rise if business access costs fall.

Fractional T1 isn't the only service in which there are interface problems for the typical user. Switched 56K bit/sec. services and AT&T's newly announced switched 384K bit/sec. service are most easily delivered in a T1 envelope, but the small user won't need enough of the services to justify the access or CPE costs. Is Integrated Services Digital Network (ISDN) justified after all, just to deliver new services to the everyday digital network subscriber?

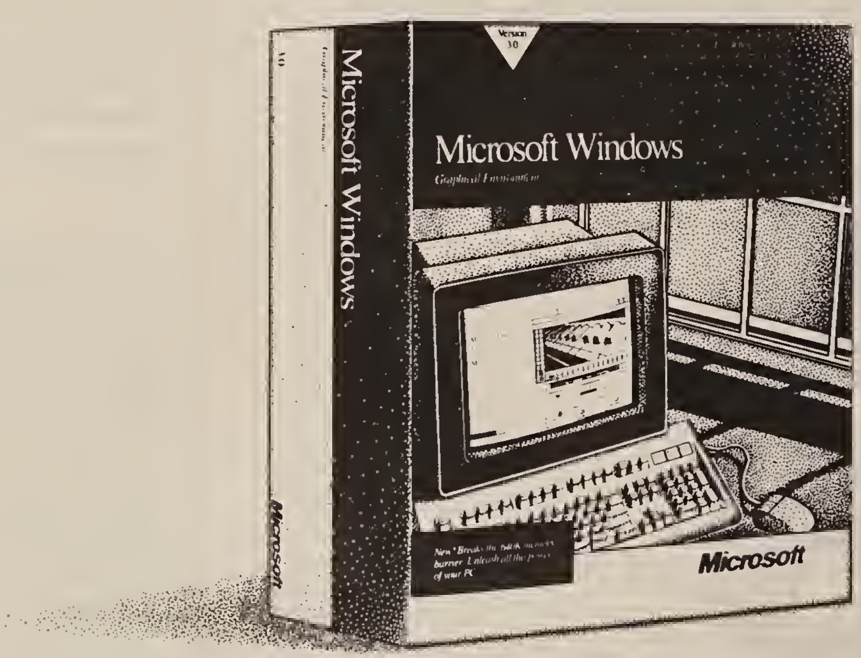
Not really. What's needed is an access interface specification that supports more than the two channels of Basic Rate Interface ISDN but less than the 24 channels of T1. The American National Standards Institute is working on a kind of "T½" interface that would provide 12 channels on two-wire copper loops.

This type of interface, if implemented in cost-effective, very large-scale integration chip sets, could reduce the cost of provisioning for the carrier and of attachment for the user.

Coupled with Synchronous Optical Network's promised capability to drop off a few channels from a high-bandwidth trunk at a reasonable price, it could make fractional T1 and the new switched digital services cost-effective from end to end.

Nolle is president of CIMI Corp., a communications consulting company based in Voorhees, N.J.

When you buy Windows 3.0 from Software Spectrum, you don't get any pains.



The new Microsoft® Windows™ version 3.0 makes using PCs remarkably easy. And Software Spectrum makes getting Windows 3.0 equally trouble-free.

Just pick up the phone and dial the number below. Your call will be taken by one of our customer service reps whose only job is taking care of you. They'll help you select the right package for your hardware configuration. And ship your order the same day you call it in.

Microsoft Windows 3.0 works within your MS-DOS® system to run numerous applications with point-and-shoot simplicity. Its graphical user interface does away with idiosyncrasies like the "C" prompt, giving you friendly icons to manage instead. The program manager supports on-screen multitasking of Windows applications. And Dynamic Data Exchange lets you link data in one program to that in another.

Finally, Windows 3.0 breaks the 640K barrier to give 286 and 386 users full access to their machines' power and memory.

Even budgeting for Windows 3.0 is painless, thanks to Software Spectrum's introductory $99 price. You can also upgrade from previous versions of Windows (or runtime versions included in such software as Excel or PageMaker®) for just $49.

Is your company hurting for a better way to work with PCs? Then call Software Spectrum at 1-800-624-0503 and order Windows 3.0 today.

SOFTWARE SPECTRUM

10420 Miller Road • Dallas, Texas 75238 • 800-624-0503

Microsoft and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation. PageMaker is a registered trademark of Aldus Corp. © 1990 Software Spectrum

BIT BLAST

Network support group formed

Network Systems Corp. has formed the Professional Services Network Consulting Group to provide customers with assistance in designing, building, managing and using their networks.

An alliance between **Nynex Computer Services Co.** and **Contingency Trading Facility, Inc.** will reportedly provide contingency planning services and physical backup trading room facilities to financial trading organizations.

A technology alliance between **Xyplex, Inc.** and **Vitalink Communications Corp.** targets the production of interoperable multivendor remote bridges. Under terms of the agreement, Xyplex also plans to resell Vitalink's Translan bridges and Transpath bridge/routers.

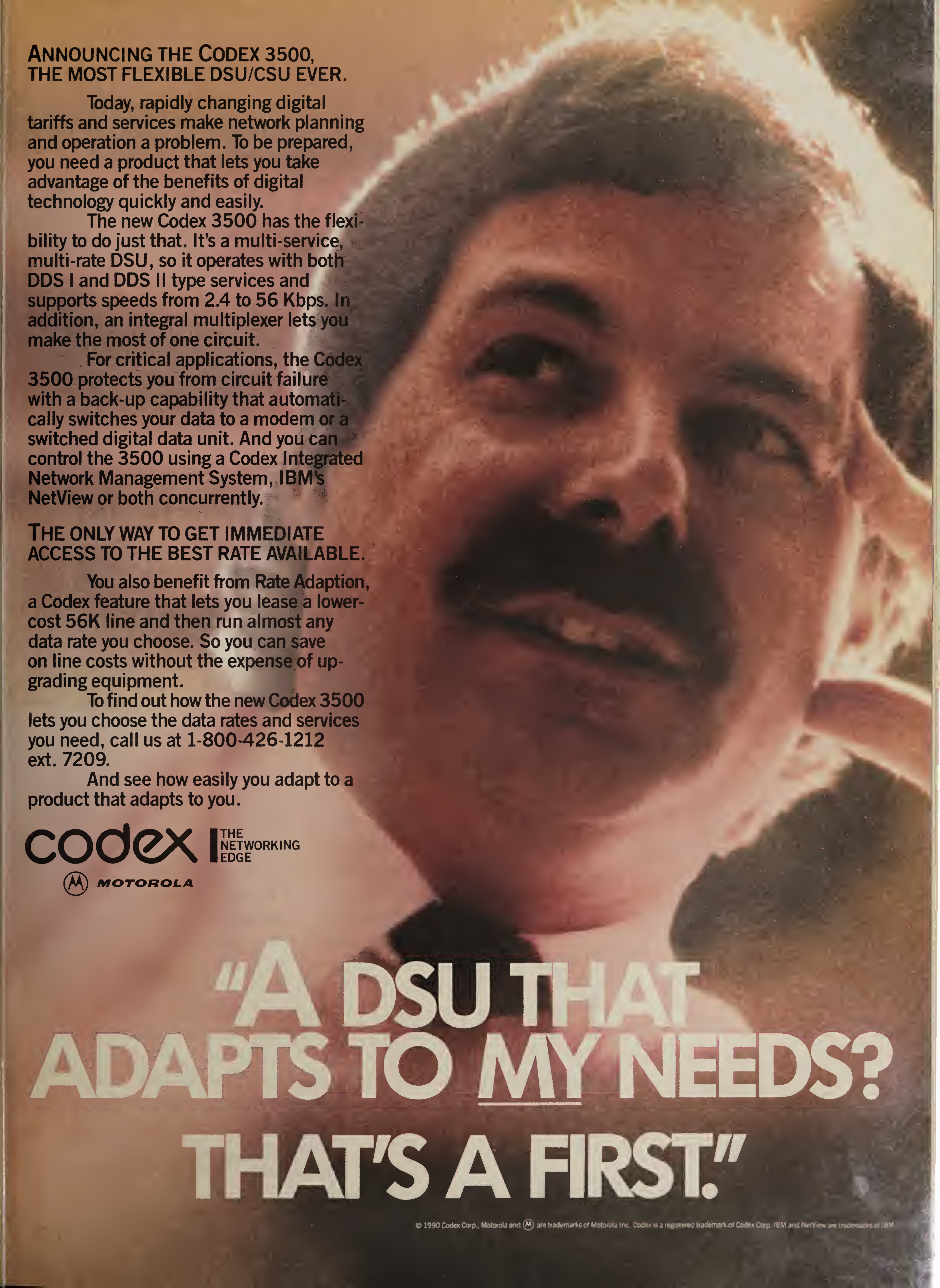
A joint venture between **Northern Telecom, Inc.** and **Nynex Business Information Systems Co.** has been launched to provide sales and service for Northern Telecom's customer premises equipment, including Meridian SL-1 and SL100/Supernode equipment.

Shiva Corp. has announced that it has acquired **Novell, Inc.'s** Fastpath product, an Apple Computer, Inc. Localtalk/Ethernet gateway supporting Apple's Appletalk, Transmission Control Protocol/Internet Protocol and Digital Equipment Corp. Decnet protocols.

Radio Free Europe, an international broadcasting organization based in Munich, West Germany, reportedly plans to distribute its newsletter, "The Radio Free Europe/Radio Liberty Daily Report," via Sprintfax, **U.S. Sprint Communications Co.'s** facsimile service.

Synoptics Communications, Inc. said it has lowered prices for its Lattisnet Model 408 10Base-T Host Module from $1,725 to $1,000. 10Base-T is an emerging standard for running 10M bit/sec. Ethernet networks over unshielded twisted-pair wiring instead of coaxial cable.

Cheyenne Software recently announced that **Netframe Systems, Inc.**, **Storage Dimensions** and **Tecmar** will resell its Arcserve software and optical backup systems for Novell servers.



"A DSU THAT
ADAPTS TO MY NEEDS?
THAT'S A FIRST."

ANNOUNCING THE CODEX 3500, THE MOST FLEXIBLE DSU/CSU EVER.

Today, rapidly changing digital tariffs and services make network planning and operation a problem. To be prepared, you need a product that lets you take advantage of the benefits of digital technology quickly and easily.

The new Codex 3500 has the flexibility to do just that. It's a multi-service, multi-rate DSU, so it operates with both DDS I and DDS II type services and supports speeds from 2.4 to 56 Kbps. In addition, an integral multiplexer lets you make the most of one circuit.

For critical applications, the Codex 3500 protects you from circuit failure with a back-up capability that automatically switches your data to a modem or a switched digital data unit. And you can control the 3500 using a Codex Integrated Network Management System, IBM's NetView or both concurrently.

THE ONLY WAY TO GET IMMEDIATE ACCESS TO THE BEST RATE AVAILABLE.

You also benefit from Rate Adaption, a Codex feature that lets you lease a lower-cost 56K line and then run almost any data rate you choose. So you can save on line costs without the expense of upgrading equipment.

To find out how the new Codex 3500 lets you choose the data rates and services you need, call us at 1-800-426-1212 ext. 7209.

And see how easily you adapt to a product that adapts to you.

codex THE NETWORKING EDGE

MOTOROLA

© 1990 Codex Corp., Motorola and Ⓜ are trademarks of Motorola Inc. Codex is a registered trademark of Codex Corp. IBM and NetView are trademarks of IBM.

Technically, It's An Architecture. But It's Really Something Else.

CA90s

Freedom.

Freedom to choose. Freedom to change. Freedom to grow. The basic tenets underlying the most advanced, and independent architecture ever developed.

The Computing Architecture for the 90s from Computer Associates.

Since it encompasses SAA, NAS and the other industry standards, CA90s gives you unprecedented freedom to integrate. Across platforms, operating systems, different vendors–throughout your entire corporate environment.

Today.

Not next year. Next month. Next week. CA90s is here today. Unlike other architectures, CA90s is already supported by the world's broadest range of software solutions.

But that's only the beginning. The best news is in how these applications work together. By sharing common services and advanced technology, CA software brings you the highest levels of integration and automation in the world.

And Tomorrow.

With CA90s, you'll be prepared for whatever happens in the future. It provides responsible, efficient ways to migrate to new technology, while protecting the enormous investment you've made in your existing technology.

Altogether, CA90s is the architecture that offers you the freedom to face tomorrow.

And it's ready just when you need it the most.

Today.

COMPUTER® ASSOCIATES
Software superior by design.

© 1990 Computer Associates International, Inc., 711 Stewart Avenue, Garden City, NY 11530-4787 1-800-645-3003
CA90s is a trademark of Computer Associates International, Inc.

Study to gauge impact of EDI on U.S. industry

BY ALAN J. RYAN
CW STAFF

SOUTHFIELD, Mich. — U.S. companies are making hefty investments — possibly hundreds of millions of dollars — in electronic data interchange (EDI) technology, but there are few ways to measure their investments or tell how the technology is affecting the nation's industrial productivity.

That is why the Automotive Industry Action Group (AIAG) and Carnegie Mellon University's Graduate School of Industrial Administration have begun a study to measure the effects of EDI, as well as its costs and benefits.

The information gathered will be used to help develop EDI curricula at colleges and universities — a field that is barely addressed today, according to John C. Martin, managing director of AIAG.

"If we are going to be able to expand on EDI technology and implement it, we are going to have to begin teaching the future leaders of our country what it is all about, what the applications are, how to implement it and how to substantiate benefits," Martin said.

As part of the project, Carnegie Mellon will establish the nation's first graduate school curriculum covering EDI.

Students who are working on the study have been assigned to the corporate sponsors — Chrysler Corp., LTV Steel Co., Texas Instruments, Inc. and Southwestern Bell Telephone Co. — to study the EDI systems in place within those companies. They will evaluate the benefits the companies are deriving and look at how they went about supporting the implementation.

The most troublesome problem posed by EDI technology, Martin said, is a lack of cross-industry standards for such computer-to-computer exchanges.

"Without national standards, efficiency will suffer, suppliers will bear unnecessary costs, and American industry will continue to fall behind," Martin said.

Early results of the study will be available in the fall.

Panel examines competition via high-tech

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — Electronic data interchange and very small-aperture terminal satellite networks are becoming key technologies that can give companies substantial competitive advantages, according to a panel of information systems officials at the CIO/AMR conference.

Beyond simply offering an advantage, EDI and VSAT networks will become competitive necessities in some industries, the panel predicted.

"If you're not thinking about EDI, you ought to begin," said David Bass, EDI project manager at the Internal Revenue Service. He said processing of tax returns is the perfect application for EDI, because it involves the electronic exchange of business data across applications in a standard environment.

Bass said EDI can pay huge dividends in just-in-time manufacturing and order processing. Kennecott Copper Co. reduced the cost of processing each order by some $100 when the company converted to EDI, he said. "Some companies now see EDI as absolutely critical to the bottom line," he added.

Bass also pointed out that EDI can reduce error rates dramatically by reducing manual data entry.

A number of companies have found that the investment required to move to EDI is not high compared with the resulting cost savings. In an informal survey of those attending the conference, most EDI adopters said they had seen payback periods of less than one year.

Peter Trainer, finance and accounting system manager at Du Pont Co., said the chemical giant recouped its investment in EDI in 12 months, but he claimed to be unimpressed with payback analyses.

"It's not a numbers game, it's a necessity. General Motors won't do business with us without [EDI]. How much number crunching do you want to do around that?" Trainer said.

Glenn Miller, director of strategic planning at Businessland, Inc., said his company had not been able to pin down its cost savings from use of EDI, which it uses to receive orders for systems and spare parts from five large customers, including Eastman Kodak Co. However, it shortens order processing time and reduces error rates, he said.

The panel was also bullish on VSAT, in which data or video is beamed to a satellite, then bounced to receivers attached to small rooftop antennas, typically for point-to-multipoint communications. Bruce Elbert, director of network operations at satellite vendor Hughes Communications Inc., said that VSAT is more reliable than conventional terrestrial networks and comparable to fiber optics in error performance.

Elbert called VSAT a "cost-reduction technology," saying it is economical for sites paying more than about $500 per month for leased-line data communications.

Elbert said VSAT has given a strategic advantage to some companies in industries such as automobiles, retailing and energy. "Wal-Mart is eating the lunch of small mom-and-pop retail stores," he said. "You just drop a dish on a store top and that store now has access to the same information systems as the whole corporation."

VSAT is increasingly being used for video transmission, according to the panel.

· SUN · RS/6000 · AT&T · IBM Mainframe · DEC/VAX · HP

INTRODUCING THE FO

FOCNET MAKES FOCUS THE EASIEST WAY

Now the shortest distance between two computers is a straight line—to the new FOCNET Connect Series.

It offers all the connections you need for complete data sharing between mainframe, mini and personal computers in your enterprise network. No matter what it is—from a LAN to a WAN.

FOCNET means fast access to distributed data. It's the only connectivity solution that gives you complete data access between network nodes. For any file type or operating system in use. Relational, non-relational, preexisting or new.

This advertisement refers to numerous software products by their trade names. In most, if not all cases, these designations are claimed as trademarks or registered trademarks by their respective companies

FOCUS for DOS · OS/2 · LAN · SUN · RS/6000 · AT&T · IBM Mainframe · DEC/VAX · A

NEW PRODUCTS

Micro-to-host

Harris Adacom Corp. has announced Strategy, the latest generation of its Supernet series of network communications systems.

The family includes the Strategy 9574, an IBM 3174 network communications controller that supports networked personal computers as LU2 devices as well as IBM 3270 machines distributed across an Ethernet network; the Strategy 9577, a print system for users of remote and networked environments; and the Strategy 9570, a programmable 3270 host gateway for heterogeneous environments.

Pricing for the Supernet Strategy series begins at $9,995.

Harris
16001 Dallas Pkwy.
Dallas, Texas 75380
214-386-2000

Simware, Inc. has introduced a software package that provides Apple Computer, Inc. Macintosh users with an interface while transparently performing the 3270 emulation functions Mac users need to access IBM mainframe applications.

Simmac 3.0 includes Views, a presentation capability that enables information systems managers to build object-oriented interfaces resembling those of Macintosh systems.

The cost of an asynchronous version is $265. Multiple-copy versions cost between $9,275 and $92,750, depending on the type of site license.

Simware
20 Colonnade Road
Ottawa, Ontario, Canada
K2E 7M6
613-727-1779

Local-area networking hardware

Connectworks Co. has announced Chainlink, a software package that enables up to 16 IBM Personal Computers, compatibles or laptops to be linked in a work-group environment.

The product uses standard telephone wire, a central switching unit and software to make a multiple PC connection. The software enables users to exchange files at a 115K bit/sec. rate, send and receive electronic mail and share peripherals, according to the vendor.

A package that includes software for four PCs, a central switching unit, two 20-ft cables and four modular connectors costs $395. Packages for connecting eight and 16 PCs sell for $595 and $795, respectively.

Connectworks
P.O. Box 497
Wrightsville Beach, N. C.
28480
919-256-2366

Aquila Communications, Inc. has unveiled four products that comply with the IEEE 802.3 10Base-T draft standard for 10M bit/sec. local-area networks.

The AQ-Hub 12 TPE 12-port unshielded twisted-pair hub ($1,595) features simultaneous support for three Ethernet cabling media. The device's 12th port can reportedly be used as an I/O port, thereby enabling multiple hubs to be linked.

Three adapters — AQ-PCE 108 TP ($345), AQ-PCE 116 TP ($395) and AQ-PSE 116 TP ($395) — that use a Fujitsu America, Inc. MB86950 Etherstar controller and an on-chip memory controller have also been announced.

Aquila
846 Del Rey Ave.
Sunnyvale, Calif. 94086
408-732-0700

Network management

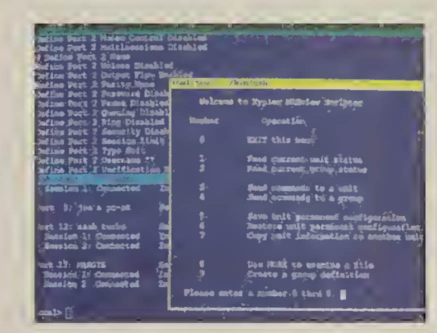
Xyplex, Inc. has announced its Maxview integrated Ethernet-based local-area network management and analysis tools.

The line includes Scriptor/Unix, Scriptor/VMS and the Scope network analyzer. Scriptor is supported on Unix hosts or Digital Equipment Corp. VAX machines running the VMS or Ultrix operating systems.

Scope is offered free with the Maxview 7610 network manager card, which sells for $2,995.

Single copies of Scriptor cost $1,995. Multiple copies (up to 10) are priced at $995 each, and site licenses (more than 11 copies) sell for $9,995.

Xyplex
330 Codman Hill Road
Boxboro, Mass. 01719
508-264-9900



Xyplex's *Scriptor is supported on Unix and VAX hosts*

Triticom has announced an analytical modeling tool for hierarchical network systems.

Paradigm can be implemented by using a series of command macros and Lotus Development Corp. 1-2-3 spreadsheets. It can be used to construct hierarchies of network component definitions to represent various network topologies.

The software runs on an IBM Personal Computer XT, AT or compatible. Single workstation versions cost $199.

Triticom
P.O. Box 11536
St. Paul, Minn. 55111
612-937-0772

Network services

Contel ASC is offering a virtual hub service as an alternative to terrestrial multidrop lines.

The service provides local access to Contel's DMN 2000 data network service for $300 per month. Subscribers receive a lease for a very small-aperture terminal unit, transmission facilities, network operations and maintenance. It can be used for remote monitoring, claims processing and reservations.

Contel
1801 Research Blvd.
Rockville, Md. 20850
301-251-4460

NET CONNECT SERIES.™

TO MOVE INFORMATION ALONG THESE LINES.

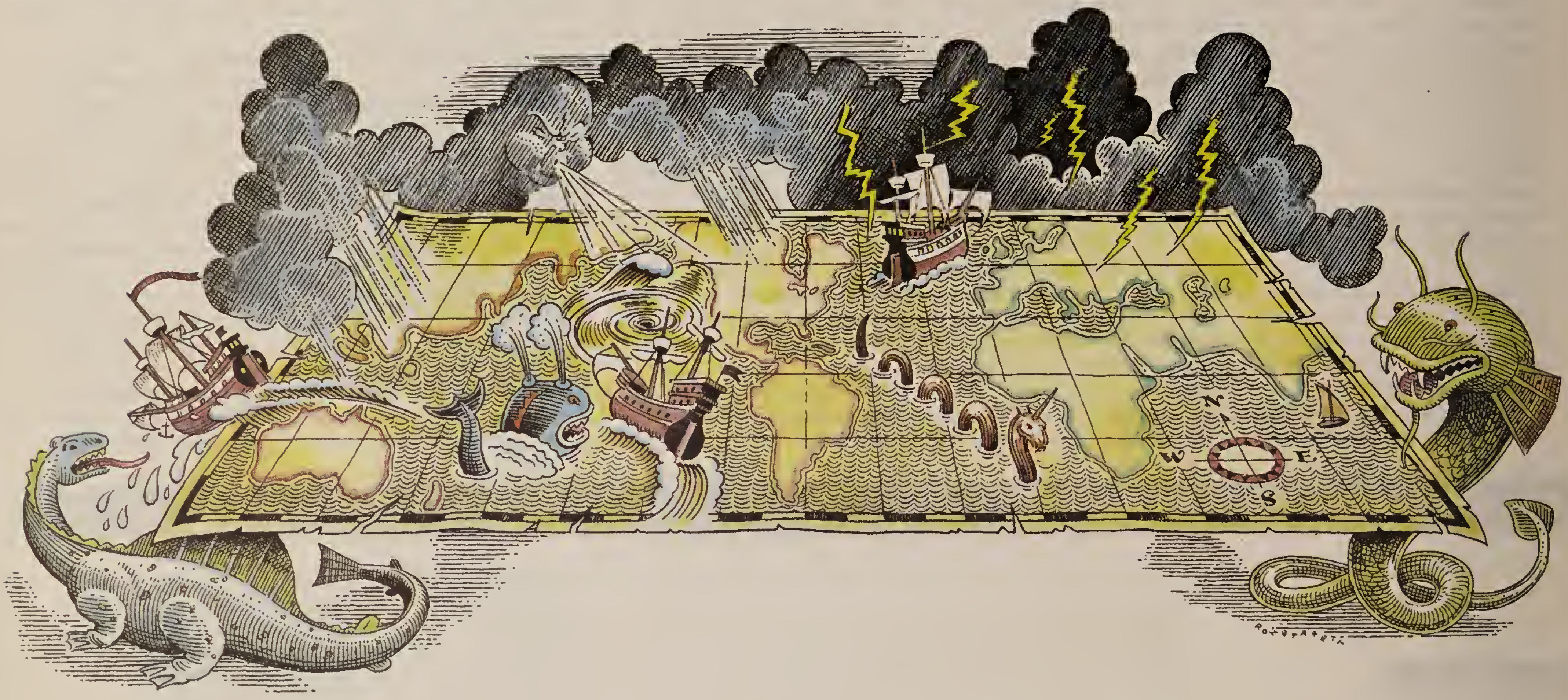
And, when FOCNET is combined with FOCUS, the world's most widely used 4GL, you get interoperability and true cooperative processing between PCs, LANs and mainframes. You can downsize applications to less expensive machines and use your processing power more efficiently—all the while preserving your investment in existing data. To learn more, call 1-212-736-4433, ext. 3700 or write Information Builders, 1250 Broadway, NY, NY 10001. If your job is getting data from here to there, you'll find FOCNET a *very* moving story.

FOCUS
Information Builders, Inc.

RS/6000 • AT&T • IBM Mainframe • DEC/VAX • AS/400 •

00 • HP • DOS • LAN • SUN • RS/6000 • AT&T • IBM Mainframe • DEC/VAX • RS/6000

Beware of one-dimensional 800 networks.



Unlike US Sprint's "flat" network architecture, AT&T's 800 Network provides more alternative routes and technologies so you'll never find yourself flat out of luck.

When it comes to 800 service, AT&T's concept of reliability is quite a bit different from Sprint's.

While Sprint® prides itself on its 100% fiber optic network, or "flat" architecture, we see this lack of diversity as a lack of reliability. For example, in some cities such as San Francisco, Sprint's 100% fiber optic network has no built-in routing alternatives in the event of a fiber cut. And that could leave Sprint customers flat out of luck.

AT&T, on the other hand, views a reliable 800 service the same way we view the world—as being well-rounded.

AT&T's 800 Service is unsurpassed in diversity and depth of protection. The AT&T Network has more miles of fiber and integrated technologies to deliver a level of call completion* unsurpassed by any long distance network. In fact, even if your 800 service is disrupted because of a problem with your own equipment, only the AT&T 800 Assurance Policy guarantees to get you back in touch with your customers within one hour.

What this means is that we have more ways to get your 800 calls through than any other network. Especially a one-dimensional, "flat" network.

So when you take a broad view of the world, you can see there's a world of difference between AT&T 800 Service and any other.

And that's the flat-out truth.

To discover a new level of reliability, just call the most reliable network in the world—AT&T.

Reliability.
Another AT&T advantage.

For more information, call your AT&T Account Executive or 1 800 222-0400.

AT&T
The right choice.

© 1990 AT&T
*Call completion results based on domestic 800 services.
US Sprint is a registered trademark of US Sprint Communications Company Limited Partnership

MANAGER'S JOURNAL

EXECUTIVE TRACK

William M. Walsh has been named executive vice-president at the **New York Clearing House Association** in New York.

Walsh, who previously held the title of senior vice-president and director of data processing, has been at the association since 1983. In his new position, he will continue to oversee all paper-based and electronic payment systems operations while taking on executive responsibilities.

Walsh is a graduate of Franklin and Marshall College in Lancaster, Pa. Prior to joining the association, he was senior vice-president/executive officer of the data service division at Connecticut National Bank.

....

George F. Thomas was named to replace Walsh as the association's senior vice-president and director of data processing. Thomas, who previously served as vice-president of systems development and technical services, joined the association in 1984.

Previously, he was systems support manager of the New York commercial district at Burroughs Corp.

In his new post, Thomas is charged with supervising systems development and technical service, computer and telecommunications operations and payments systems support. He attended Adelphi University in Garden City, N.Y.

....

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Keeping centralization on track

Trailer Train's Anderson conducts large-scale systems development projects

BY SALLY CUSACK
CW STAFF

From her large, windowed office at Trailer Train Co.'s downtown Chicago headquarters, Carol J. Anderson can see the boats and barges along the Chicago River. As the newly appointed vice-president of MIS, however, she has little time to appreciate the view.

Since accepting Trailer Train's top information systems position last January, Anderson has been responsible for several large-scale projects, starting with an IBM Application System/400 installation at headquarters. She has followed that up with an IBM DB2 evaluation, an electronic data interchange development project and an ongoing commitment to using computer-aided software engineering technology.

"One of the things that keeps me motivated is a variety of opportunities to do a variety of things," she says. This has apparently been true throughout her career.

Anderson initially signed on with Trailer Train in 1972 after a brief stint as a programmer/analyst at SAMI, Inc., a subsidiary of Time, Inc. Trailer Train, which supplies 65% of the flatcars used in North America, was making a major commitment to IS development at the time. She says she remembers being impressed by what the firm had to offer.

Back then, the railcar leasing company had just migrated from an IBM 360 Model 30 running DOS to an IBM 370 Model 145 running OS, and when Anderson came on-board, she was initially tagged as the "OS" expert on staff. Anderson recalls that she was enthusiastic about the company's commitment to development.

"My background is totally development," she says. "Initially, I worked on some of our car accounting systems — repair, billing, things like that. Over the course of the years, I've worked in all areas."

Trailer Train now depends on an IBM 3090 Model 150E to process the firm's 75 applications under the MVS/ESA operating system. The mainframe is scheduled for an upgrade next month, Anderson says.

Thinking back to her earlier days at the company, Anderson says she remembers that as she was ready to handle more responsibility, opportunities seemed to open up. "My predecessor, Richard Shelgren, was willing to give employees as much responsibility as they could handle," she says. Shelgren retired last year after 38 years in the railroad industry.

There doesn't seem to be much Anderson can't handle. She enjoys a holistic lifestyle, parceling work, exercise,

Continued on page 70

PROFILE: Carol J. Anderson

David Joel

Position: *Vice-President of MIS, Trailer Train Co.*
Mission: *To oversee action plans that will move the company from a decentralized to a centralized computer environment*

Companies can't live on technology alone

BY JOANNE KELLEHER
CW STAFF

Investing in information technology may buy you a few pockets of performance improvement, but it won't bring you either a sustainable competitive edge or any measurable improvement in earnings.

This was the sobering message that MIT's Michael Scott Morton delivered to attendees of the MIT Center for Information Systems Research's (CISR) recent summer session in Cambridge, Mass. He and other researchers at CISR have looked very carefully, he said, and no matter how hard they squint at the data, the conclusion keeps coming up the same: "There is no correlation between the amount spent on information technology and the payback."

There are several ways to explain this gap, Scott Morton said, and at least two of them are valid, although not terribly helpful, in terms of pointing a way out of the situation.

One explanation is that while there are benefits to be derived from technological investments, they often accrue to the customer, not the company. Secondly, there is the rate at which the marketplace digests innovation, constantly demanding more for the same price.

Another argument, which Scott Morton said he is increasingly inclined to view with skepticism, is that time will close the gap and benefits will eventually catch up with expenditures. "In three years of research," he said, "there hasn't been any sign of that happening."

The major problem, Scott Morton suggested, is that companies are trying to overlay new technologies on old structures, management processes and work roles. All the effort and money spent on installing new hardware, software or networks won't get you anywhere, he said, unless you also invest equal or greater amounts in training, work redesign, new reward structures and whatever else it takes to effect a substantive change in the corporate mind-set. "Unless you invest as much in those areas as you do in technology, it won't do you any good," he said. "In fact, I'd argue that the investment here should be much more, perhaps three or four times as much."

Even if a business is willing to allocate those kinds of sums, it must also have a wealth of patience, Scott Morton added. Benefits will still take time to materialize. "We have not seen payoff in less than five years, and it would be best to plan on six to eight years of consistent investment," he said.

Sometimes you look around you and you feel blue. Too blue. You look for something else. Something new. Something exciting.
Then turn to red.
Red is COMPAREX.
COMPAREX is something really different. Different, but still compatible with all your computing systems. Which means COMPAREX improves the abilities of your system whatever it is. You have the real freedom: The freedom of choosing the very best.
COMPAREX offers you cleverer solutions than anyone else. For instance, to improve your computing productivity by changing some peripherals instead of continuously increasing the power of your central unit.
Hence, a better return on investment.
No wonder: COMPAREX is a company of BASF and Siemens. That's why COMPAREX

IF YOU FEEL TOO BLUE, TURN TO RED.

people are so dedicated and feel fully responsible for their systems.
See computing world in its true colors: Pick up the color of excellence. The red one.
COMPAREX.

COMPAREX Informationssysteme GmbH
Gottlieb-Daimler-Str. 10, D-6800 Mannheim 1, West Germany
Phone 0049-621-4009-0, FAX 0049-621-4009-744

The Expert in computing.
COMPAREX
A BASF and Siemens Company

COMMENTARY

Nell Margolis

Bad aptitude

Remember *Bizarro World*? I wish I didn't. At least, I wish I didn't remember it when I do, which is just about every time I'm confronted with the U.S. business community's latest efforts to keep every conceivable vestige of risk at bay.

The original *Bizarro World* was innocent enough. One of the shorter lived recurring skits attempted by *Saturday Night Live*, (*SNL*) it posited a planet inhabited by folks who looked just like latter-day Americans, but whose counterlogical reasoning process led to predictably bozo results. The joke, of course, was that — notwithstanding the Twilight Zone-ish intro music and the neo-early-Kurzweil voices in which the Bizarro Worldians spoke — everything tagged as possible only in *Bizarro World* was actually going on in 1980s America, even as we watched. *SNL* cancelled *Bizarro World*. I sure wish someone would cancel Bizarro Business World.

In the latest episode, the Princeton, N.J.-based Educational Testing Service — yes, that name you recall from the upper lefthand corner of the big manila envelopes that used to strike dread into your heart back in your high school days, none other than the folks who created the Scholastic Aptitude Tests — came up with a similar aptitude test for managers to use on prospective office workers. It's already being referred to as the SAT of the workplace.

To borrow from another *SNL* favorite, Wayne Campbell of *Wayne's World*, this is an excellent idea — not.

It is generally agreed that the U.S. commercial sector stands in the early stages of a suddenly global economy where we have scant hope of remaining a major player unless we face up to a laundry list of economic and social realities. (Remember the auto industry of the early 1970s? Remember trade barriers and economic isolationism? Remember quarterly thinking?)

Considering that we find ourselves and our institutions in a seriously entrenched stage of risk-aversity just when survival — if not in the abstract, certainly survival as what most of us like to picture when we hear the word "America" — calls on us to face and even embrace major amounts of risk, it seems that this is, to say the very least, a poor time for that bastion of business, the corporate office, to be cowering farther and farther under the desk.

Yet, that is precisely what has occurred. (Tune up the *Bizarro World* theme.) Just take a look at the Bizarro curve (up, *up*, down, down, down, down, down) on this one:

- *Circa* 1988, we see a growing recognition on employers' parts that all that stuff they've been spouting in press releases about employees being a firm's true capital is accurate. There follows a mass movement to find the best employees and give them extremely rich and rewarding work lives, right?
- Wrong. In Bizarro World, what follows is a mass panic, during which employers become virtually paranoid about hiring something other than optimally skilled, upright, drug-free, loyal employees.
- In an effort to assuage this panic (and in temporary forgetfulness of the fact that panic, by definition, isn't subject to being assuaged) employers increasingly abdicate their own judgment in favor of the conclusions of a series of tests: drug tests, polygraph tests, career suitability tests, handwriting tests and even all-day, multipart personality tests. (One stockbroker told me the story of a rival firm that spent a decade wooing him because of his outstanding track record at his own firm. Finally, he gave in and agreed to defect to the rival — which withdrew its offer after a career

Continued on page 70

We hold everything together. Sophisticated centralized dispatching streamlines service calls.

Bring home the bacon. Comprehensive field service that stimulates your sales and profits.

Well done. Quality service backed by two decades of experience and thousands of satisfied customers.

We do it with relish. Nationwide on-site service for OEMs, VARs and VADs.

Get everything on it. Higher profits. Better customer satisfaction. Improved product image.

Seasoned to taste. Flexible contracts to suit your specific needs.

Say cheese. Customer satisfaction that keeps you–and your customers–smiling.

Lettuce be your partner. We work with you to form a valuable business partnership.

What we learned about Field Service flexibility over lunch.

One day at lunch, we made an interesting observation.

We noticed that nobody ordered exactly the same hamburger.

Which made us ask ourselves. Why should every OEM, VAR and VAD get exactly the same field service program?

It's simple. They shouldn't.

So today, McDonnell Douglas Field Service Company offers you flexible service options to fit your requirements.

You choose the type and level of service that best suits your needs, and we will design the right service package for you.

Learn more about the wide range of McDonnell Douglas Field Service options. Contact us today at 1801 East St. Andrew Place, Santa Ana, CA 92705-6520; **(800) 826-4944.**

Our service will impress you.

MCDONNELL DOUGLAS

Centralization

CONTINUED FROM PAGE 67

recreation and personal time into balanced portions.

Her day typically begins with a 5:30 a.m. workout at Chicago's East Bank Athletic Club, and she is usually at the office at 7:45 a.m., sometimes earlier. She runs regularly and says she has made some of her "best promotional decisions" while jogging.

"I prefer to get into work early," she says. "If I am frequently staying late, I find it eats into my time by myself, and time to myself is important to me."

Team spirit

An avid sailor, Anderson also spends about half the summer weekends crewing in competitive sailboat racing events. Team sports have always played an important part in her life, and she applies the team-effort philosophy to corporate culture.

"There's a lot to be learned from team sports," she says. "You're never going to win or lose based on one person and their performance — people have to pull together."

Anderson graduated from Rosary College in River Forest, Ill., and earned a master's degree in economics from DePaul University in Chicago. She received her initial computer orientation through the math department at Rosary.

"I switched to ecomonics, thinking it was less theoretical than math," she says, adding that since then, she can see how college computer science programs have developed along both theoretical and technical lines to create a more complete, real-world picture. She says she believes that today's computer science students appear to be fairly sophisticated and very well prepared for a career in IS.

Anderson's diverse educational background has apparently served her well — she is a perfectionist, by her own admission, and a stickler for detail.

"She has a keen mind," says Chuck Malone, who succeeded Anderson as director of systems development this year. "She doesn't forget — if she makes a commitment to do something, she'll see it through."

Malone has worked with Anderson for 12 years and describes her as a person committed to target dates and definitive action plans.

One such action plan that Anderson is overseeing is the task of hooking the company's approximately 60 remote sites to the host computer, effectively taking the organization from a decentralized to a centralized computer environment.

The move toward a centralized computing environment falls in step with Trailer Train's overall corporate philosophy, Anderson says.

"At one time, the divisions were wholly owned subsidiaries, but now they are integrated into a centralized company structure," she says, adding that the company started looking at centralization in the 1980s.

"The fact is, you don't need a small computer out in the field if you can provide the same support via the mainframe," she continues. "We think it's a more economical way to go — we can more effectively provide support through a centralized operation."

Another example of this is the recent AS/400 installation. The minicomputer replaced an IBM 8100 at the home office and three Wang Laboratories, Inc. VS 45s at division repair shops. All were being used in a word-processing capacity.

When all is said and done, the team player approach is apparently paying off for Anderson and the IS group at Trailer Train. Malone, who categorizes Anderson as an optimist, says that she is the type of person you want on your side.

"She'll go to bat for you," Malone says, "and that's important."

Margolis

CONTINUED FROM PAGE 69

suitability test required of all entrants showed that the seasoned veteran, who was then earning in the $300,000-per-year range selling stock, did not have the psychological profile to be a stockbroker.)

- As test-o-mania spread, 1988 and '89 statistics showed an increasingly drug-free, loyal, highly motivated and perfectly suited work force — right?
- Not in B-world. The more the approach appeared not to work, the more avidly it was pursued. Finally, in late 1989, came the inevitable backlash. As employee testing came under fire from civil rights defenders of various sorts, who started to pose their own virulent brand of risk — i.e., risk of *lawsuits* — an air of reconsideration began to waft through the executive suite.

And now, just when it looked like we were wising up, comes this new low in executive abdication: SATs for the office. By *Bizarro World* standards, it's a natural: Why not take a test that educators agree doesn't really work (standardized testing, enlightened educators concede, selects the best test-takers rather than the brightest or most creative or most flexible minds) and apply it to a situation in which testing itself is proving an awkward and unreliable fit?

Happily, there is still the hope that business managers will follow the example of *SNL*'s programmers and knock this one out of the coming season's lineup.

Margolis is *Computerworld's* senior editor, industry.

Falling behind in Workgroup support

Leave single workstation developers in the dust with powerful multi-user DesignAid II. Effective team support of sophisticated CASE projects demands interactive repository access... for faster development, better communications, and reduced database administrative costs. Workgroup support is tomorrow's goal for all CASE tool vendors. DesignAid II offers it to you today.

CASE pioneers Transform Logic and Nastec, combined through a recent merger, have been quietly building this multi-user CASE expertise for over a decade, while supporting large scale application development among Fortune 1000 companies.

Only True Multi-User System
Unlike the products of KnowledgeWare and Index Technology, only DesignAid II from Transform Logic offers true workgroup capability.

DesignAid II and AutoDraw are registered trademarks of Transform Logic Corporation. IBM and AD/Cycle are registered trademarks of International Business Machines Corporation.

Accelerate CASE development with workgroup support.

Unique features of this powerful CASE design tool include 100% graphics/text editing, AutoDraw for computer-aided drawing/redrawing of complex diagrams, and a level of education and training from our Professional Services division uncommon in the CASE world.

☐ Yes, I'd like details of the workgroup support offered by DesignAid II's multi-user capability. Please send the PC Magazine feature-by-feature comparison story too.

What is your PC environment? (Check all that apply)
Hardware: ☐ XT ☐ AT ☐ PS/2 ☐ Other
Operating System: ☐ DOS ☐ OS/2 ☐ OS/2EE ☐ Other
Network: ☐ Novell ☐ 3Com ☐ Other
Do you use structured techniques? (Check all that apply)
☐ Dataflow diagraming ☐ Data modeling
☐ Real-time systems modeling ☐ Information engineering
☐ Other

Mail this card today, or for a faster response, call
1-800-825-6442

"DesignAid does it with FLYING COLORS"
25
62

Name____________________
Company____________________
Title____________________
Address____________________
City/State/Zip____________________
Telephone____________________

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 448 SCOTTSDALE, AZ.

Postage Will Be Paid By Addressee

TRANSFORM
LOGIC

Transform Logic Corporation
8502 E. Via de Ventura
Scottsdale, AZ 85258-3220

CLIPS

Tim Lewis

Summaries from leading scientific and management journals

The Journal of Systems Management

May 1990

"Comparing Knowledge-Based and Transaction Processing Systems Development"

By W. J. Kenny Jih

■ There is a great interest in introducing knowledge-based expert systems technology into traditional business information systems. Analyzing knowledge-based expert systems and traditional transaction processing systems can help this integration.

Transaction processing systems and knowledge-based expert systems differ in the following seven design areas:

- Basic mission. The emphasis in transaction processing is how information flows through the organization. Knowledge-based expert systems are usually developed to solve a specific problem.
- Knowledge structure definition. Because transaction processing systems are typically static, they lend themselves to database management systems in which data is defined to allow for efficient manipulation. In a knowledge-based expert system, on the other hand, the relationships among constructs is complicated, vague and implicit. A knowledge-based expert system uses flexible methods, such as production rules, frames, logic, semantic nets and transition nets, to represent knowledge.
- Certainty and completeness. In transaction processing system development, input must be expressed precisely and completely for straightforward implementation. In a knowledge-based expert system, input need not be complete.
- Shareability. Because the database is the central component of most transaction processing systems, there is a great degree of database sharing. In a knowledge-based expert system, the knowledge base is the counterpart to the database. A distinct knowledge base must be constructed for each problem.
- Human interface. In transaction processing, a user interface is not a major consideration in system development. But in a knowledge-based expert system, two distinct human interfaces must be present: The end-user interface makes the system easier to use, while the domain expert interface facilitates the knowledge acquisition process.
- Abstraction. In a transaction processing system, there are two kinds of abstraction: data abstraction, which supports data independence, and action abstraction, which provides generic procedures for data manipulation. In a knowledge-based expert system, a knowledge base contains knowledge at a higher level of abstraction than data. The way knowledge is processed is shielded from the user.
- Validation. Many systematic techniques exist to validate a transaction processing system, but for a knowledge-based expert system, validation remains ad hoc.

University of Minnesota MIS Research Center

Working Paper 89-02

"The Information Technology Champion: Some Preliminary Findings"

By Cynthia M. Beath and Blake Ives

■ There is widespread agreement that successful implementation of a strategic information technology project requires a champion for the new system. Information technology champions tend to be business managers who take responsibility for shepherding a technology project from visionary concept through the development process.

Information technology champions — sometimes known as cheerleaders, zealots or change agents — typically break down bureaucratic barriers to get an innovative project moving while competitors are still doing feasibility studies. However, a headstrong champion may also be "a nightmare come to life" for the top information systems executive.

How can the IS executive and the project champion work together? Interviews with 15 such champions provided the following conclusions:

- Champions already have a vision. What they need is help fleshing out their ideas, including technical details.
- Champions want to work with the best experts from the IS department.
- Champions, who want to change the organization in a hurry and dislike formality, put a premium on flexibility from the IS department — flexibility in the project planning and approval process and in technology choices.
- Champions deeply appreciate cooperation, support and legitimization from the IS department.

the CASE race?
adds horsepower.

DesignAid II offers project team support and a level of productivity that can't be matched with the limited check-in/check-out approach of a partitioned database.

DesignAid II also offers other unique features that our competitors lack. In addition to our full LAN capability, we provide 100% graphics/text editing plus AutoDraw for computer assisted drawing and redrawing of complex CASE diagrams.

A recent PC Magazine article (January, 1990) which reviewed the 10 leading CASE design products found that DesignAid offered substantially more features than any of the rest.

An IBM Development Partner
Of equal importance is our commitment to IBM's AD/Cycle. This includes a new, easy-to-use CUA compliant user interface that allows easy adaptation to AD/Cycle standards.

In addition, CSP, the powerful COBOL generator in AD/Cycle, incorporates application development and expert system technology from Transform Logic. Currently, Transform has a large staff working side by side with IBM in their development center.

With IBM building CASE products using Transform technology, you can be certain of a smooth migration path to AD/Cycle. Nobody is closer to IBM's development team than Transform.

Special Pricing for LAN Users
DesignAid II may not be for everyone. Not all development is done in network environments. But if you are under pressure to create large systems, or you need simultaneous access to data, remember, DesignAid II is the only CASE tool that delivers this capability. For a limited time, there is an opportunity to save over $17,000, based on a 6-station LAN purchase.

Extensive Education and Training Assistance
Unlike some CASE tool vendors who turn you over to third party support, we offer a Professional Services division, the first CASE vendor to provide this level of support.

"DesignAid does it with FLYING COLORS"
SAYS PC MAGAZINE

Call 1-800-825-6442 For More Information
For your PC Magazine article reprint and detailed product information, call 1-800-825-6442. Then compare DesignAid II feature-for-feature with other CASE vendor offerings. We think you'll appreciate the edge offered by Transform Logic.

Transform Logic Corporation,
8502 E. Via De Ventura, Scottsdale, AZ 85258-3220.

1-800-825-6442

TRANSFORM
LOGIC

First with interactive workgroup support

KnowledgeWare is a registered trademark of KnowledgeWare, Inc. Index Technology is a registered trademark of Index Technology Corporation. © Copyright 1990 by Transform Logic Corporation.

CALENDAR

The Development Center Institute, Inc. will hold its Fall 1990 productivity conference for information systems professionals Sept. 30-Oct. 3 in Indianapolis.

The conference is designed to provide a forum for IS workers to share experiences in the acquisition and use of productivity hardware and software; planning for increased productivity; improving the quality of delivered applications; and other issues facing systems development and maintenance personnel.

Sessions will focus on alternative solutions to the problems posed by large, technologically outdated systems that are still essential to the business. Topics will include selecting an alternative strategy; rebuilding aging systems; the people issues in maintaining such systems; and measuring productivity in the maintenance environment.

For more information, call the Development Center Institute, Indianapolis, Ind. (317) 846-2753.

JULY 8-14

Service and Quality: Transforming Vision into Reality. St. Louis, July 11-13 — Contact: Donna Skaggs, Washington University, St. Louis, Mo. (314) 889-4556.

Relational Technology Seminar. Palo Alto, Calif., July 12-13 — Contact: Codd and Date, San Jose, Calif. (408) 441-6400.

JULY 15-21

Association of College and University Telecommunications Administrators Annual Conference and Exhibit. Orlando, Fla., July 15-19 — Contact: Lisa McLemore, ACUTA, Lexington, Ky. (606) 252-2882.

Managing Quality Function Deployment. Dallas, July 16-17 — Contact: Technology Training, Torrance, Calif. (213) 534-3922.

EDI in the International Marketplace. San Francisco, July 16-18 — Contact: International Congress Registrar, Alexandria, Va. (703) 838-8042.

Engineering Workstations Conference. Boston, July 16-18 — Contact: EWC, Santa Monica, Calif. (213) 450-0500.

Industrial and Engineering Applications of Artificial Intelligence and Expert Systems. Charleston, S.C., July 16-19 — Contact: Dr. Moonis Ali, University of Tennessee Space Institute, Tullahoma, Tenn. (615) 455-0631.

Telephone Network Overview. Cincinnati, July 17-18 — Contact: CBIS Network Technologies, Cincinnati, Ohio (800) 543-4477.

Database World Conference & Exposition. Santa Clara, Calif., July 17-19 — Contact: Digital Consulting, Andover, Mass. (508) 470-3870.

Macintosh/New York Conference & Exposition. New York, July 17-19 — Contact: Exposition Management, Waltham, Mass. (617) 290-0400.

Multivendor Networking: Linking PCs, Minis and Mainframes over Local- and Wide-Area Networks. San Francisco, July 17-20 — Contact: Learning Tree International, Los Angeles, Calif. (800) 421-8166.

Data Processing Disaster Recovery Plan. San Diego, July 17-20 — Contact: Harris Devlin Associates, Wayne, Pa. (215) 341-8854.

SNA Gateways: An In-Depth Examination. Santa Clara, Calif., July 18-20 — Contact: J2 Software Labs, Santa Cruz, Calif. (408) 292-6300.

Dealing with Vendors & Suppliers Seminar. Boston, July 19 — Contact: Jacqueline Nerette, University of Bridgeport Metropolitan College, Bridgeport, Conn. (800) 874-8118.

JULY 22-28

North American Conference of International Business Schools Computer Users Group Meeting. Omaha, July 22-25 — Contact: Sufi Nazem, College of Business Administration, University of Nebraska, Omaha, Neb. (402) 554-2816.

Guide 77 Convention of Midsize and Large-Scale IBM Systems Users Group. Chicago, July 22-27 — Contact: Guide International, Chicago, Ill. (312) 644-6610.

Rapid Application Development Seminar. Chicago, July 23-25 — Contact: Technology Transfer Institute, Santa Monica, Calif. (213) 394-8305.

The CAMMP Show for Computer-Aided Graphics, Multimedia and Presentations. Chicago, July 23-27 — Contact: Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Multi-Net Expo '90. Houston, July 25-26 — Contact: Ann Garner, Multi-Net Expo, Houston, Texas (713) 827-8030.

Utah State University IT Institute. Logan, Utah, July 25-28 — Contact: Monique Squire, Logan, Utah (801) 750-1690.

Knowledge Acquisition & Engineering Conference. Cambridge, Mass., July 26-27 — Contact: International Business Communications, South Natick, Mass. (508) 650-4700.

Marketing the IS Organization Internally. Chicago, July 26-27 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7373.

Directions and Implications of Advanced Computing Symposium. Cambridge, Mass., July 28 — Contact: Coralee Whitcomb, DIAC, Cambridge, Mass. (617) 891-3103 or (508) 945-0360.

JULY 29-AUG. 4

AI-1990 Conference. Boston, July 29-Aug. 3 — Contact: American Association for Artificial Intelligence, Menlo Park, Calif. (415) 328-3123.

Workshop on Electronic Information Exchange Standards Used in Document Processing Applications. Gaithersburg, Md., July 30 — Contact: Lori Phillips, National Institute of Standards and Technology, Gaithersburg, Md. (301) 975-3881.

Insourcing vs. Outsourcing: The Summit Meeting. Atlantic City, July 31-Aug. 1 — Contact: The Yankee Group, Boston, Mass. (617) 367-1000.

Delaware Valley DB2-SQL/DS Users Group Meeting. Essington, Pa., Aug. 1 — Contact: Jean Tucker, Scott Paper, Co., Philadelphia, Pa. (215) 522-6294.

Computer Security in the '90s Conference and Exposition. Atlanta, Aug. 1-3 — Contact: Inforum, Atlanta, Ga. (800) 343-5048.

Coming soon from Candle: a CICS monitor that will make headlines.

Candle®

In a perfect world applications from different companies would work together like they came from the same company.

NAS. The pe
for an imp

Digital's Network Application Support (NAS) lets you integrate applications and share information across your multivendor environment.

Up to now, the dream of getting all your applications to work together has been just that – a dream. Digital's NAS now makes it a reality.

NAS is a set of software products for using and developing integrated applications running on different vendors' systems. While other computer companies are still wrestling with how to get their own computers to work together, Digital – a company whose computers have always worked together – offers a way to get your applications to work together. Even those running on systems that aren't ours. In fact, NAS works across the widest range of systems in the industry.

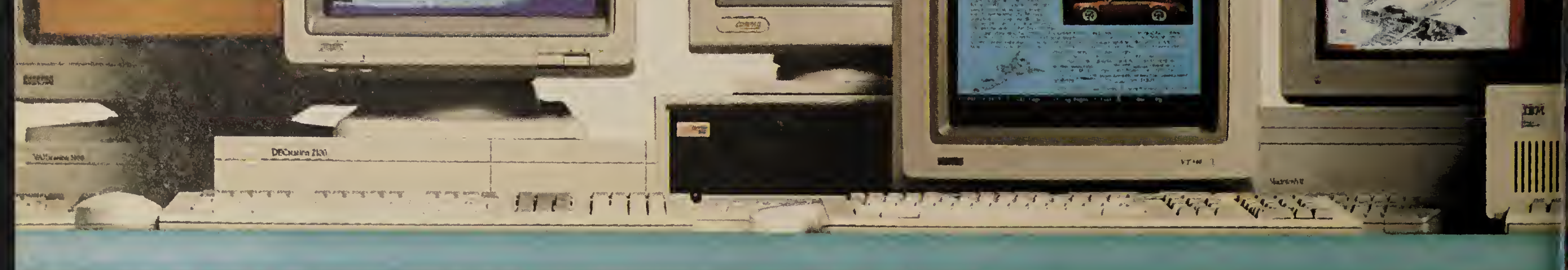
NAS. How it works.

Using a typical example, we'd like to show you one of the many ways NAS can be used in your real-world environment.

You can take graphics from an Apple Macintosh,® a Lotus® spreadsheet from an MS-DOS™ PC, a drawing from a UNIX™ workstation, data from an IBM® mainframe, a scanned image from the network and integrate them all into a single report. You can then send it electronically to others anywhere on the network, and even include up to the minute connections to source data. Sound easy? With NAS it is.

NAS. Why it works.

Achieving integration like this requires just the things Digital is very, very good at. Like networking. And



© Digital Equipment Corporation 1990. The Digital logo, Digital has it now, ALL-IN-1 and DECwrite are trademarks of Digital Equipment Corporation. Macintosh is a registered trademark of Apple Computer, Inc. Lotus is a registered trademark of Lotus Development Corporation. MS-DOS is a trademark of Microsoft Corporation. UNIX is a registered trademark of American Telephone and Telegraph Company. IBM is a registered trademark of International Business Machines Corporation. All other registered and unregistered trademarks above are the property of their respective holders.

digital™

rfect solution rfect world.

software compatibility. And the adoption and promotion of open standards. Digital's leadership in these and other key areas is what makes NAS unique.

NAS. What it means to you.

Simply put, NAS gives you unequaled freedom of choice.

For IS managers, NAS means you can choose to grow in any direction you want. Also, the systems you chose in the past will work with NAS. So, your investment is protected.

For developers, NAS means you can write software once and know it will work on other systems. Savings in time and money can be substantial, allowing you to focus on improving your applications or reducing the backlog.

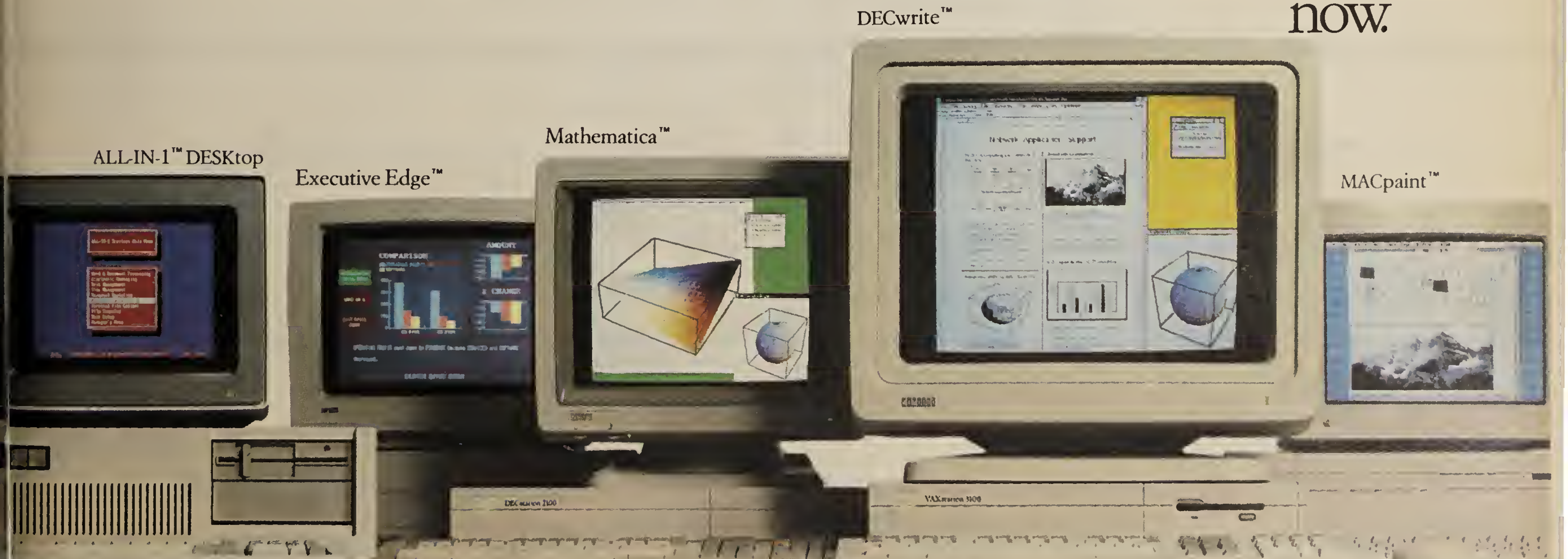
For users, NAS means you can continue to use the applications you're most comfortable with, but also be able to share information with others much more easily.

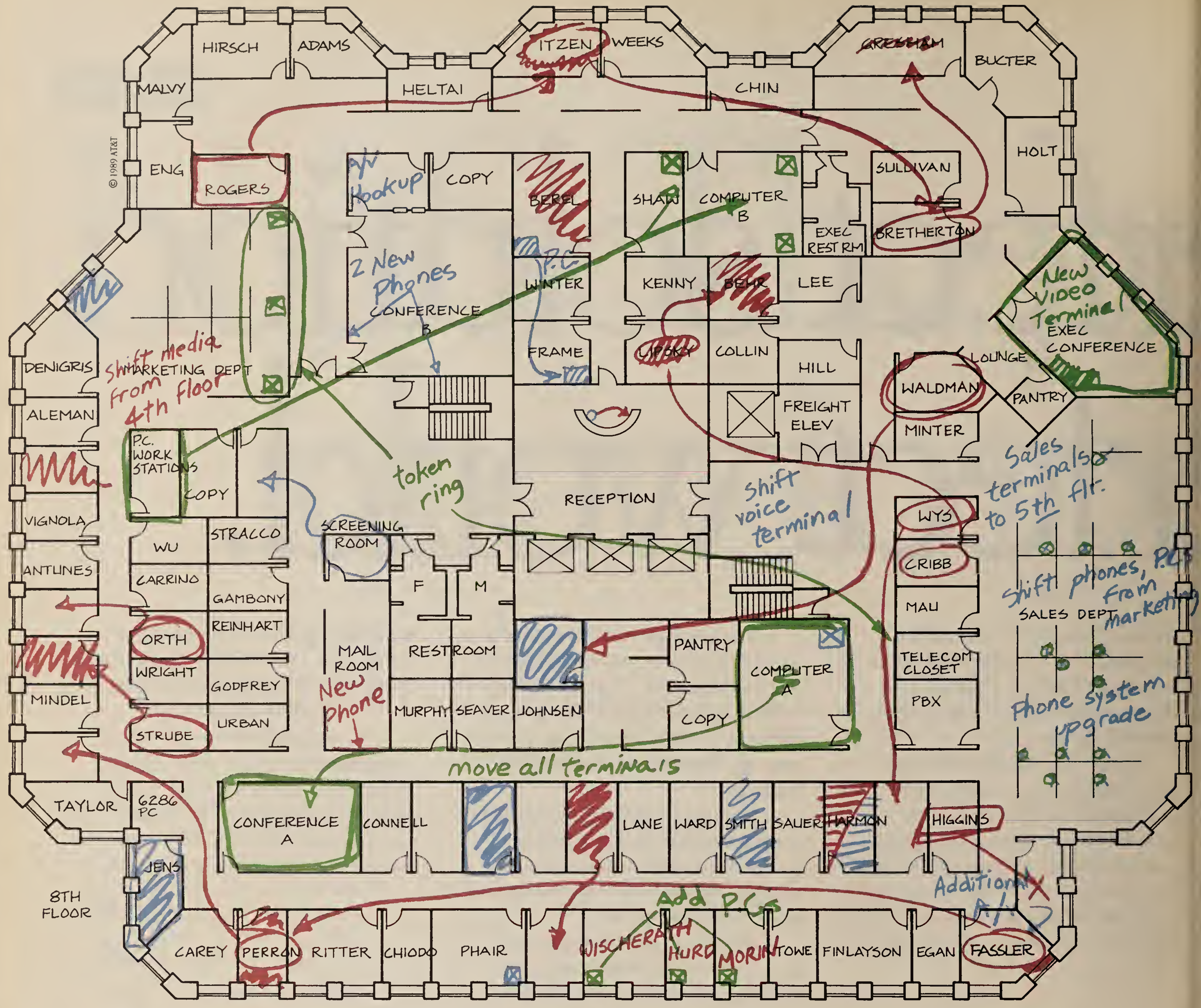
For the whole company, NAS means that with more computers working together, more people are working together. That, of course, means more productive workers and the ability to compete more effectively.

NAS. Available now.

Getting all your applications to work together is not some promise, somewhere down the road. NAS is here. Now. For more information on NAS, call 1-800-343-4040, ext. 376. Or call your local Digital sales office.

Digital
has
it
now.





© 1989 AT&T

"The only thing not changing is their wiring system."

With conventional wiring, this little reorganization could cause quite a lot of disorganization. But with the AT&T SYSTIMAX® Premises Distribution System, you simply plug voice, data and video equipment into our standard jacks, and everyone's right back in business. No hassles, no cabling, no big costs.

The open architecture of SYSTIMAX PDS supports products from over 100 manufacturers, including the AT&T DEFINITY® Communications System, and conforms to ISDN-ANSI and FDDI standards. Even LANs are a snap with SYSTIMAX PDS. AT&T can tailor a solution to your needs, building a mix of fiber optic and unshielded twisted-pair media that will carry you into the future.

To learn more about the world's finest cabling scheme, ask your AT&T Account Executive about SYSTIMAX PDS, or call us at 1 (800) 247-1212, Ext. 418.

AT&T
The right choice.

EXECUTIVE REPORT

MAKING INFORMATION FIT TO USE

ADVANCING THE BUSINESS CAUSE

Ending time-wasting games of information hide-and-seek

BY MICHAEL L. SULLIVAN-TRAINOR

Keith Glover, a senior vice-president at Mutual Benefit Life Insurance Co., wants new business, but he almost can't afford it.

"Any growth in new business requires us to add people exponentially for each increase," he says.

Signing up new policyholders is a labor-intensive process. Underwriters, or case managers, as they are referred to at Mutual Benefit Life, have to obtain medical records from external databases using personal computers, access insurance-agent licensing data and policy history information stored on the company's mainframe and look up underwriting guidelines in an encyclopedic manual.

Encumbered with these kinds of time-consuming procedures, Glover's current staff cannot easily stretch to cover add-on business. In the past, he has had to increase the number of case managers with each new rise in policies. If some way is not found to increase the productivity of the current staff, another 30 additional hirings will be required this year to manage an anticipated 40% increase in new business.

This is not a business reality that Glover finds easy to swallow. "To get our information, we have to live with a tyranny of computer systems. We have to adapt ourselves to the systems rather than have them enhance our ability to do the work," he says.

Fast access to well-defined information is becoming a pressing issue for business managers. Like Glover, many are starting to chafe that they cannot get the information they need — in the time frame that they need it — because of cumbersome storage and retrieval methods or fragmented databases.

Joyce Ravid

Mutual Benefit Life's *Glover (left), Drewry (center) and McCaig worked to fit the pieces of the information puzzle together*

Fortunately, it is almost certain that Glover will soon be able to put those complaints in the past tense and avoid the investment in additional case managers, thanks to an information systems initiative called "The Inside Edge." This project is aimed at producing PC systems capable of duplicating the information-gathering and selection process of the case managers using mainframe interfaces and expert systems.

Although the project is not slated to be fully implemented until the fall of 1991, 40 of Glover's 120 case managers will soon be using the new systems on a single product line. Other product lines and managers will be added gradually, alleviating the need to hire additional staff.

The system will provide Glover's staff with all the information it needs at individual workstations. The workstation software will also make decisions about what pieces of information are required for specific types of policies. The expert system will automatically approve policies that are under $100,000 if they meet all the rules of the program. When this system is completely installed, it will free underwriters to handle more applications and increase their productivity by an estimated 40% to 50%, Glover says.

IS professionals are generally aware of the need to make data more accessible and more useful, but determining exact informational requirements for business departments is, they say, turning out to be a lot harder than it sounds.

One major obstacle is the tendency of users to shy away from information technology and rely on IS professionals to know how to apply it to their business. On the other side, IS groups are often overly absorbed with the technical rather than the informational or business issues.

"I can remember when we users were afraid of technology," Glover says. "We would say to the IS folks: 'You tell us what's best for us.' They wouldn't know what we needed exactly, so our arm's-length approach produced solutions that were less than optimal."

Talking around the issue

Conversations between users and IS professionals can often become frustrating exercises in guesswork and indirection. Business staffers, who have limited knowledge of what is actually possible with current technology, try to phrase their needs in terms of what they think is realistic. Meanwhile, IS personnel trying to gather information on the basis of only a glancing acquaintance with the business process often miss the real need behind specific complaints.

At Mutual Benefit Life, a couple of organizational measures have helped to reduce these communications barriers. To begin with, the company set up a program in which line managers and IS professionals swap roles for a year. It also created a new hybrid position spanning both line and IS functions.

As senior vice-president of corporate planning and systems development at Mutual Benefit Life, June Marrero Drewry is both a business strategist and an applications development

INSIDE

Folding the outside in
Page 80

Redefining the library
Page 81

AT&T brings sources to seekers
Page 84

Sullivan-Trainor is a *Computerworld* senior editor, features.

Hide-and-seek

FROM PREVIOUS PAGE

manager. While her position was not specifically designed to solve information problems, her intervention in Glover's case led to a breakthrough.

Drewry sat down with both business and IS executives to explore their concerns. After talking to Glover and Charles McCaig, senior vice-president of corporate IS services, she was able to see a critical intersection between Glover's productivity concerns and a question that McCaig had been pondering: How could intelligent workstations fit into the company's computing structure?

Drewry's experience in central systems gave her the background necessary to understand McCaig's vision. Her position as a high-level planner and liaison meant that she had both the right listening post and the executive access to acquire several million dollars' worth of funding.

It's one thing to understand the broad outlines of a problem and quite another to actually isolate all the specific requirements for a well-targeted solution. In order to achieve the latter, Drewry says, it is critical to get users to talk about what they need in an uninhibited fashion. While her status as a newcomer was enough to prompt a statement of the issues out of Glover, she felt something more was required to dig detailed requirements out of users.

That's when the company turned to an outside facilitator.

"The users were accustomed to asking only for what they thought we could do technically rather than telling us what their information needs were," Drewry says. Talking to a facilitator helped them to drop that constraint, she says, and also guaranteed that there would be no naysaying from IS to reimpose inhibitions.

"We had no red-lighting — only greenlighting of ideas without focusing on cost or time issues. We tried to do everything the users asked and only backed off where it was absolutely not technically feasible," Drewry says.

While many IS professionals are working at a departmental level to fashion the best fit of the company's information to the people who use it, a few brave souls are also tackling the need to provide senior executives with all the management information they require to make the right decisions.

"Lack of information and lack of access to it is a critical problem for executives today," says Ross Brownridge, director of business planning at Pratt & Whitney Canada, Inc. in Montreal. "Without it, managers cannot track what's happening in their companies."

Chief obstacle

Frequently, the chief obstacle to solving this problem is not IS, or even user attitudes about technology, but entrenched feelings of ownership. In many cases, databases have been created as local entities, and line managers resist any attempts at unification because they do not want data about their vital functions housed within widely accessible systems.

Brownridge is currently struggling with that problem. Hard-copy reports are the primary tools of management at the company, says Brownridge, whose career spans the gamut of Pratt & Whitney's operations — including 10 years running an IS organization. But they are delivered at the will of the functional units, not the senior management. "They often contain contradictory information, and it's impossible to run them back and instantly update them," he says.

Pratt & Whitney's Brownridge *says sharing information has become a company objective*

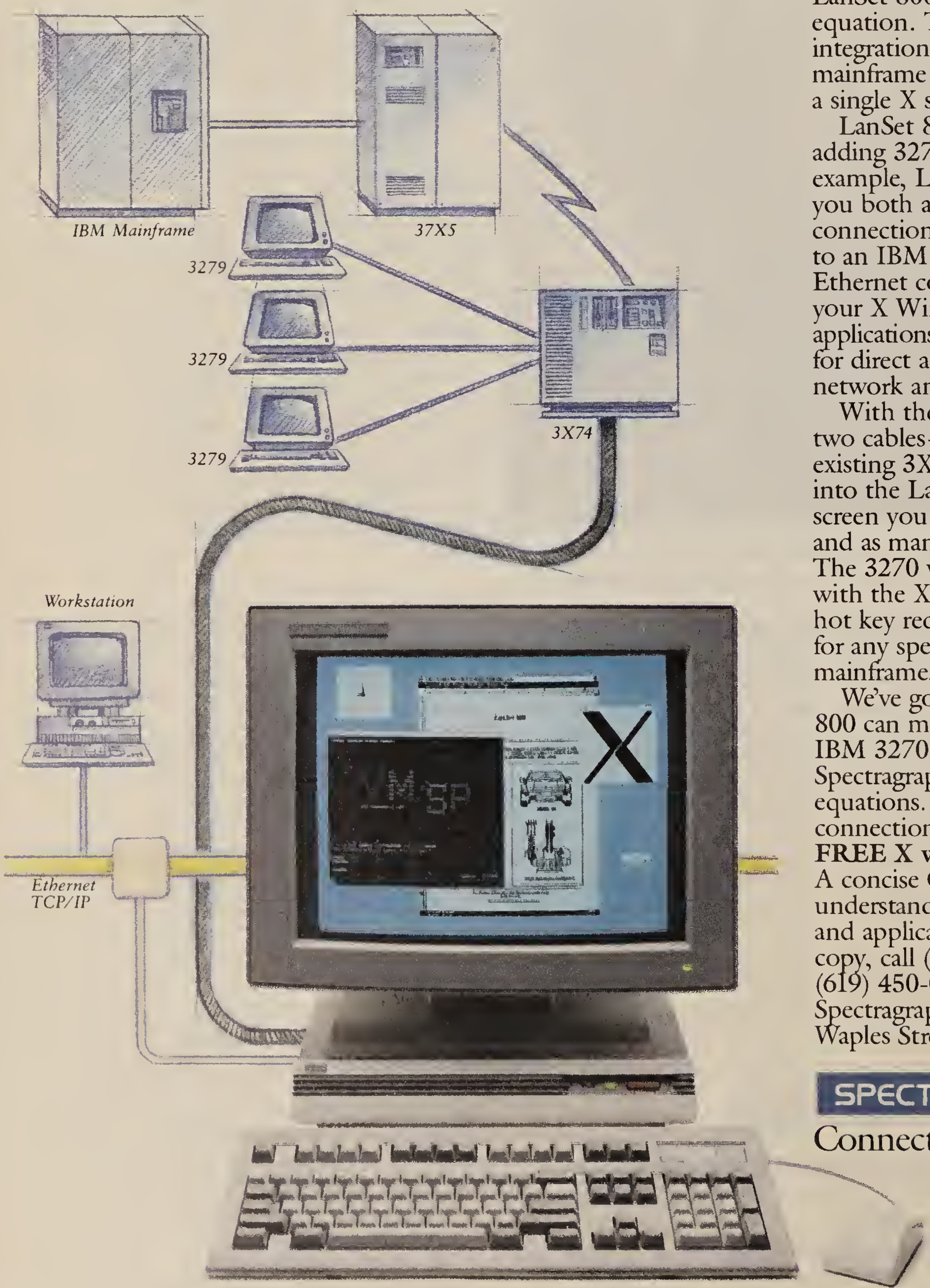
Thus, management often doesn't look at the reports until something goes wrong and they need the detailed information. This management-by-crisis style prevents executives from anticipating events and responding to changes quickly.

To make sure they have what they need, Brownridge is trying to create an on-line library containing all the reports, charts and graphics the managers require. It has been slow going. Although he developed the system with the help of IS in 1986 using simple mainframe-to-terminal systems, only a fraction of the company's reports are on it. While 25 senior managers have access to the system, only a half-dozen of them rely on it for their decision-making.

Resistance to the system, Brownridge says, comes primarily from line managers who refuse to convert hard-copy reports to on-line versions, even though their reports are already the product of on-line systems.

Brownridge had originally hoped to overcome resistance by leaving control of the information with the line functions. However, that idea did not prove fully

X+3270=LanSet



LanSet 800. A new X Window equation. To give you full integration of X Windows and mainframe 3270 connectivity in a single X server.

LanSet 800 has several ways of adding 3270 functionality to X. For example, LanSet 800/3270dc gives you both an Ethernet TCP/IP connection and direct connection to an IBM 3X74 controller. Use the Ethernet connection for access to all your X Window and other UNIX applications. Use the IBM connection for direct access to your SNA network and SNA applications.

With the LanSet 800/3270dc, two cables–Ethernet and your existing 3X74 coax–plug directly into the LanSet X server. On the screen you have a 3270 window and as many X windows as you like. The 3270 window is fully integrated with the X environment, with no hot key required. There's no need for any special software on your mainframe.

We've got lots more ways LanSet 800 can meet your X Window and IBM 3270 needs. Check out all of Spectragraphics' X Window equations. We have the right connections for you.

FREE X windows Guide.
A concise Guide to help you understand X window technology and applications. For your FREE copy, call (619) 587-6969, FAX (619) 450-0218. Or write, X-Guide, Spectragraphics Corporation, 9707 Waples Street, San Diego, CA 92121.

SPECTRAGRAPHICS®
Connecting with your ideas.

LanSet is a trademark of Spectragraphics Corporation. All other trademarks and copyrights acknowledged. © 1990 Spectragraphics Corporation.

effective. "The ownership and responsibility for the reports rests with the line functions, but executive management is looking at these, and the owner of the information is sometimes concerned about the exposure," he says.

Brownridge has had to call on Chief Executive Officer L. David Caplan to encourage further participation. Caplan has made it a management objective this year to place all operating reports on the system. "Before, we were just trying to stimulate the various departments and management levels to change. Now, it's a company objective," he says.

The fact that businesses are organized according to line function rather than informational flow also hampers IS' efforts to devise new systems that better fit users' informational needs. At most companies, mission-critical transaction processing applications were designed to work in single-function environments.

"Now, we are finding that the data users need for new business requirements is buried in seven different specially designed applications, and it's defined in seven different ways," says Barbara Helmer, president of Data Architects in Atlanta.

Having to chase pieces of information from one application to another was a significant part of the case managers' problem at Mutual Benefit Life, Drewry says. "We're talking about front-ending two major mainframe applications and interfacing with CICS and IMS, as well as adding expert system functionality. Only OS/2 in its newest release could handle it," she says.

Bell Atlantic's Frieder *says new approach gives users more control*

Comes with the territory

New technical challenges often come with the territory of solving information problems. For example, at New York Life Insurance Co., James Coffee, assistant vice-president and project director, is using image processing and an "electronic desktop" concept to help 70 underwriters obtain the information they need in a more accessible form.

As at Mutual, New York Life underwriters are forced to spend considerable amounts of time — usually hours and sometimes even a whole day — obtaining source documents needed to process new insurance applications. Most of the documents are in paper files. Imaging will allow instant on-line access of the information, and it will be integrated with information residing in applications on the company's mainframe.

Bringing scattered information together on the desktop is not the only technical accommodation required to make information truly usable for certain individuals. "Lots of our underwriters do not use a terminal or a keyboard, so we designed a way for them to use a tablet and stylus and actually write their comments, instantly transferring them to the on-screen image," Coffee says.

The idea for the project came to Coffee after he had to manage a central records department in which all insurance records were still maintained in paper files. He was unhappy with the number of extra steps and long waiting periods associated with file retrieval.

To find out how best to correct this situation, Coffee and members of the IS staff conducted a very detailed study, tracking the processing of insurance applications from field operations to the home office.

The complexity of the imaging system required the hiring of a systems integrator. TRW Financial Systems, Inc. was chosen to build the system, which will run on Sun Microsystems, Inc. minicomputers using Unix. The project will be implemented next year.

Many IS organizations believe there is no substitute for personal acquaintance with the business process in terms of trying to spot and correct kinks in information flows. Rather than depend on chance to draw IS personnel into situations in which they can experience a problem for themselves, some are restructuring the IS group to maximize exposure to the real world of information use.

At Bell Atlantic Corp., for example, a portion of the IS group functions as a sales force. IS staffers are assigned to sell, rather than just take orders for systems services. The IS client services group is divided into account managers, each of whom has responsibility for one or more of 15 client divisions. The account managers attend user staff meetings and work out strategic plans and pricing levels.

The new approach gives users "an opportunity to select their own projects, but they also have more responsibility for defining what they want," says Dave Frieder, director of IS professional services. For example, one group of 25 users in Bell Atlantic's external affairs office in Philadelphia is struggling with the drawbacks of an information flow that requires them to pull public utility tariff and pricing information off an antiquated minicomputer using dumb terminals, then fax the material or send it via overnight mail to other parts of the company.

As the IS account manager for the group, David Gardiner, director of business service consulting, addressed the users' frustrations by assigning members of his staff to investigate the business problems posed by the poor information flow. Very soon, the group will start working in a PC and local-area network environment that is slated to reach full implementation by early September. Network connections will allow electronic reports to be sent between offices, eliminating the need to redraft them or change their formats to accommodate the minicomputer system. In the future, Gardiner plans to investigate whether the network will allow reports to be sent electronically to the Public Utilities Commission.

In the meantime, progress has already been made as a result of efforts on the part of the IS staff to educate the users on their current alternatives, including electronically transmitting documents outside their divisions. "They knew there was a better way to do things, but they didn't understand that technology could facilitate the information flow beyond their own offices," Gardiner says. ●

Scattered matter

Fragmented information handling is costing companies dearly in terms of lost revenues and opportunities, says William Durell, president of Data Administration, Inc., a Princeton, N.J., consulting firm.

In most cases, Durell says, top managers are not aware of what is being lost as a result of data incompatibilities. When they do become aware, it is often because they have an immediate need for information in a form that does not exist. In such an event, the IS executive usually takes the blame.

This scapegoating is unfair because the fragmented nature of information handling in companies is almost always the result of corporate structure and culture rather than IS policy or performance. "The single biggest challenge to shareable data is the profit center mentality," Durell says. "Every profit center wants to hoard their own information. They want to get access to everyone else's information but don't want to share their own."

This is hard to explain to a heated executive whose plans are thwarted by an inability to get the data he needs when he needs it. Durell suggests IS managers should gather evidence about how this form of organization stymies effective data sharing and aggressively lobby for reforms.

Durell says some of the most effective evidence to collect is as follows:

- Costs of having duplicate applications in different departments.
- Estimates of cost savings through coordinated volume purchasing.
- Counts of customer service complaints that can be shown to stem from division of records by product lines.
- Instances in which one department is undercutting another. One example is a vendor that has been cut off by one department for unsatisfactory service but is still employed by another.

JODIE NAZE

Which leading company has developed the last branch automation systems you'll ever need to buy?

Who created these products to fit virtually any environment, be it UNIX- or MS/DOS-based?

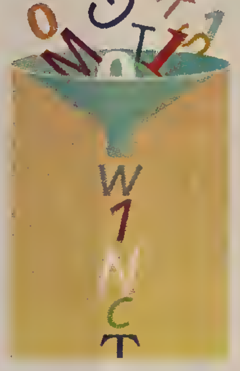
Channeling the flood of data from outside on-line services

BY LARRY STEVENS

In a world where fast maneuvers are imperative and markets are changing daily, business managers are not only desperate to get internal information in order but also to add value to it through targeted use of external information services.

What this means for information systems departments is a growing demand for exotic blends of native and foreign information, served up in the most digestible form. Few managers possess the skills to craft complex searches and sift through a mountain of irrelevant data to find nuggets of gold in the middle. Thus, many are looking to IS to help by filtering information from dial-up services and integrating external and internal data.

Steven Rubinow, director of decision support services at Quaker Oats Co. in Chicago, says executives there needed financial and market data on their competitors' activities. So they got accounts for databases from vendors such as A. C. Nielsen Co. and Dow Jones & Co.



However, being assigned a password and being able to efficiently search a database were two different things. So Rubinow made searching easier in two ways. First, he created a proprietary front-end system that allows executives to search various on-line databases using a menu-driven command structure. Second, he devised a system for collecting data that executives access frequently and integrating that data with internal corporate information to produce a series of daily, weekly and monthly reports.

The process of combining external and internal data required a mixed bag of tricks. Each dial-up service — and, in many cases, the individual modules within each service — uses different data formats. So Rubinow couldn't build a generic translator to import all downloaded data from every information resource into his firm's database.

However, he was able to craft translators for some services that offer a large amount of structured data, such as stock prices. For these reports, he leases a tape or downloads from the service overnight and uses his proprietary translator to bring the data into the corporate database, where executives can access it as they would internal information. For smaller reports or for those that include data that doesn't fall comfortably into rows and columns, such as new product announcements, Rubinow has his staff manually format the information.

"The best place for information that our executives need is in our database," Rubinow says. "If it's not there, we have to make sure it's easy for our executives to find it elsewhere."

Executive feeding

Paul Saffo, research fellow at Institute for the Future in Menlo Park, Calif., expects that executive demand for such filtering will increase. Managers want their information "coming from a straw rather than a fire hose," Saffo says.

Saffo says he believes that it is the responsibility of the IS department to provide easy access to on-line information services by incorporating that data into internal databases. "If you have to build a car every time you want to go for a drive, you'll choose to walk," he says.

Sometimes, giving executives easy access to information can be more a matter of organization than of technology.

Dick Rand, director of executive information services at Consolidated Rail Corp. in Philadelphia, looked at the possibility of integrating on-line data with in-house information and found that the varying formats from the data services as well as the large number of different reports that his executives needed made that task impractical. "There was no way we could translate all those different formats into a single data system without devoting years to the project," Rand says.

Instead, he chose to fully support two data services — Prodigy and Dow Jones News/Retrieval. His staff is ready to help users choose which of these services is best for each type of information and prepare searches. Rand also purchased Commander, an executive information system from Comshare, Inc. that helps executives search Dow Jones News/Retrieval.

According to John Clippinger, director of multimedia in organizational intelligence at Coopers & Lybrand in Boston, there are two challenges in dealing with external data. The first is the need to format the data so it can be integrated into internal systems. "There is no 'techno-magic' in that," he says. "It takes some work and some expertise. But it can be done using today's available technology."

The second, more intractable, problem is creating a system that locates

Continued on next page

Stevens is a free-lance writer based in Springfield, Mass.

"Our ISI printers are solving problems the IBM printers couldn't."

"Our requisition form could choke an ordinary printer. It's six-parts thick, with peel-off labels on the top sheet. Yet it's no problem for our ISI printers."

"Right now we use Programmed Symbols to produce graphics, but when we upgrade to IPDS, we won't have to change printers. Our ISI printer supports both."

"We just brought up our first bar code system. ISI's printers have bar coding ability built in, so we didn't have to invest in special software or custom programming."

"Between mainframe jobs, we use our ISI printer for PC printing. Its dual coaxial and serial ports make it a true multi-host printing resource."

Unlike other plug-compatible manufacturers (PCMs), we do not build terminals, drives, or keyboards. Only printers. Our engineers work on nothing else. They combine over 150 years of experience in producing plug-compatible printers for IBM mainframe and mid-range system users.

This focus enables us to respond quickly to changes in IBM technology, while building into our printers the advanced output and paper-handling capabilities that IBM and other manufacturers simply don't deliver.

Our printers are shop-floor rugged, yet office-friendly. Simple loading and operations make them easy to use for anyone. And since they connect directly to your IBM systems, you don't have the mess of boards, boxes, or other gadgets.

With Interface Systems, you get proven reliability. Since 1975, we've manufactured plug-compatible printers for thousands of IBM 3270, S/3X, and AS/400 users. Each model is backed by complete documentation, service, and technical support.

You also get PCM economy. Our printers cost much less than corresponding IBM models. . .extra features and all.

To learn more, call us today at **1-800-544-4072**. Or write to us at 5855 Interface Drive, Ann Arbor, Michigan 48103. FAX: 313/769-1047.

Interface Systems, Inc.
Printer Solutions for IBM Systems

Extending walls of corporate libraries

BY LAURA O'CONNELL

Imagine a chemist creating a new drug. He needs to research what is known about specific substances and what other researchers have done before him. That could entail gathering information from scattered locations.

Eli Lilly and Co. in Indianapolis is sure there has to be a better way. The pharmaceuticals manufacturer is working toward bringing competitor information, now held in various business groups and libraries, to desktops in on-line form.

Distributive efforts of this kind are becoming quite common. As rapid access to information becomes a higher priority, business libraries are becoming both aggressive users of computer technology and feeder sources for on-line corporate networks. In a survey published by the Special Libraries Association in Washington, D.C., nearly 90% of 164 senior managers say their libraries will increase use of computer applications during the next five years. Also, many firms are extending libraries beyond their usual physical confines — not just adding computers to the room but piping data directly to desktops.

Information systems organizations and librarians can be co-workers in this endeavor. "If you want on-line services — fast, accurate, timely data — and you want it screened for you, you have to have a technical person, and you have to have an information person," says Larry Prusak, a principal at the information management group of Temple, Barker & Sloane, Inc., which conducted the survey.

On the same team

At Eli Lilly, IS is working on a project with the Scientific Information Resource Services group. The task involves the creation of a system that would give researchers, marketers, sales professionals and other users fast and easy access to competitor information.

About a year ago, the research division assembled a cross-functional team to plan the system. This working group consists of one physical scientist, one employee from the resource services group and two systems people. Paul Bryan, the information scientist on the team, explains that the mix of backgrounds addresses the gamut of concerns. The physical scientist knows what users need, the information scientist knows how to select and structure information and the computer scientists know what kinds of systems will work.

Other companies have also teamed up their library function with IS. At Nynex Corp. in White Plains, N.Y., Information Access Center director Davida Scharf has an IS employee on her staff.

Scharf says she has a lot of interaction with IS and that IS does more than installation, support and maintenance for her group. Currently, Nynex is working on a piece of internally developed software that would continuously and automatically index and distribute information to individual users. The center is working with IS to define the information that best suits the needs of each user group.

"The problems of content being partitioned by the real world make it such that you can't just dump everything all in one big pot and search it," Scharf explains. Corporate libraries "are playing an ever-increasing role" in disseminating information to users, she says.

IS doesn't need to be center stage to work well with libraries. At Corning, Inc. in Corning, N.Y., an automation project for the Business Support Library, one of several libraries throughout the company, is driven to a large extent by the marketing department, under whose domain the library falls.

The genesis of the project was a strategic information audit, which revealed that people in the departments that the library serves did not want to have to leave their desks to get information. "What people told us was that they were willing to walk a maximum of 10 feet to get to a library," says Gary Rauche, manager of business information. "When you're geographically spread out like Corning is, the only way to cost-effectively do that is to put the library on their desks in the form of a computer."

Rauche has been working on the project for four years. He says the group hired Henco Software, Inc. in Waltham, Mass., to help set up a system that integrates internal and external data, which then can be disseminated according to individual profiles set up by the users. Rauche says they had pilots running for about 1½ years but are now starting to connect an entire operating division to the network.

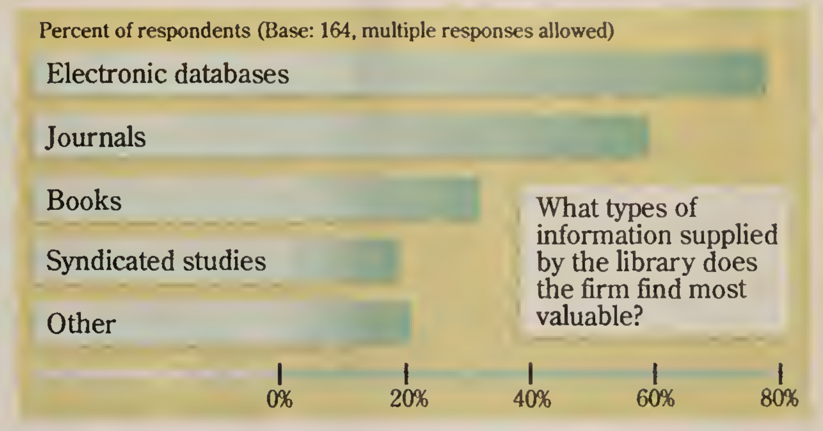
Henco wrote most of the programming, including a front end for its Synchrony information integration package, because the IS staff at Corning was unfamiliar with full-text search and retrieval systems, Rauche says. The firm is now training Corning's IS staff, which will support the system.

That is not to say that Corning's IS is not usually involved with projects. The company's IS group originally set up the Digital Equipment Corp. VAX network and the electronic mail system over which the new Business Information Exchange network will run. And Rauche continually interacts with IS. "The way it works is that I end up being a user coordinator for IS," he explains. •

O'Connell is a *Computerworld* associate editor, features.

Resourceful thinking

Users say on-line databases are the most valuable media provided by corporate libraries



Source: Special Libraries Association

CW Chart: Doreen Dahle

Continued from previous page

relevant information efficiently and filters out extraneous data. "It won't do much good to build a database to accept downloaded data if you have to depend on keyword structure to find information," Clippinger says. Keyword searches, he adds, typically result in too much irrelevant information being accessed. A user who views data on-line could filter out unneeded information. An automatic system that tries to integrate external and internal data would not be able to do so.

Dawn Hartley, a consultant at the Jet Propulsion Laboratory in Pasadena, Calif., agrees that the main sticking point in integrating data from dial-up services is the difficulty in finding the right information. Her company is developing a system for the Department of Defense that combines information from commercial and military dial-up services. The project will let 50 high-level users define their information needs and receive a report containing data from various services.

"The problem wasn't combining the formats of the services; we were able to work that out," Hartley says. "The problem was having each service understand the user's query." She says that in early versions of the system, a query resulted in "a flood of paper when the user expected to get a one-page report."

While building systems that integrate external and internal data may be a daunting task, most experts say it is inevitable.

Margaret T. Fischer, vice-president of Link Resources Corp. in New York, says that executive requests for information found outside the company's database are increasing at an average of 18% to 19% a year. Right now, Fischer says, only a few IS departments are helping executives get the information they need.

Firms integrating external and internal data will give their executives tools to react quickly to changing business conditions, Fischer adds. "During the '80s, companies worked on fourth-generation languages and other tools to let executives access their own company's database without having to request reports from the data processing department," she says. "During the '90s, IS will have to give executives the same functions with dial-up services." •

Here's a hint:
It's not IBM.

It's ISC-Bunker Ramo.

Introducing Pinnacle Plus and The Power Banking branch automation systems. And we want to show you how ISC-Bunker Ramo is revolutionizing branch automation so much we're willing to go head-to-head in a test with IBM, NCR or any of the other guys. And if we don't outperform them, we guarantee your money back. Any questions?
Ron Mason 509/927-5600

Sharing a strong family resemblance can be a curse.

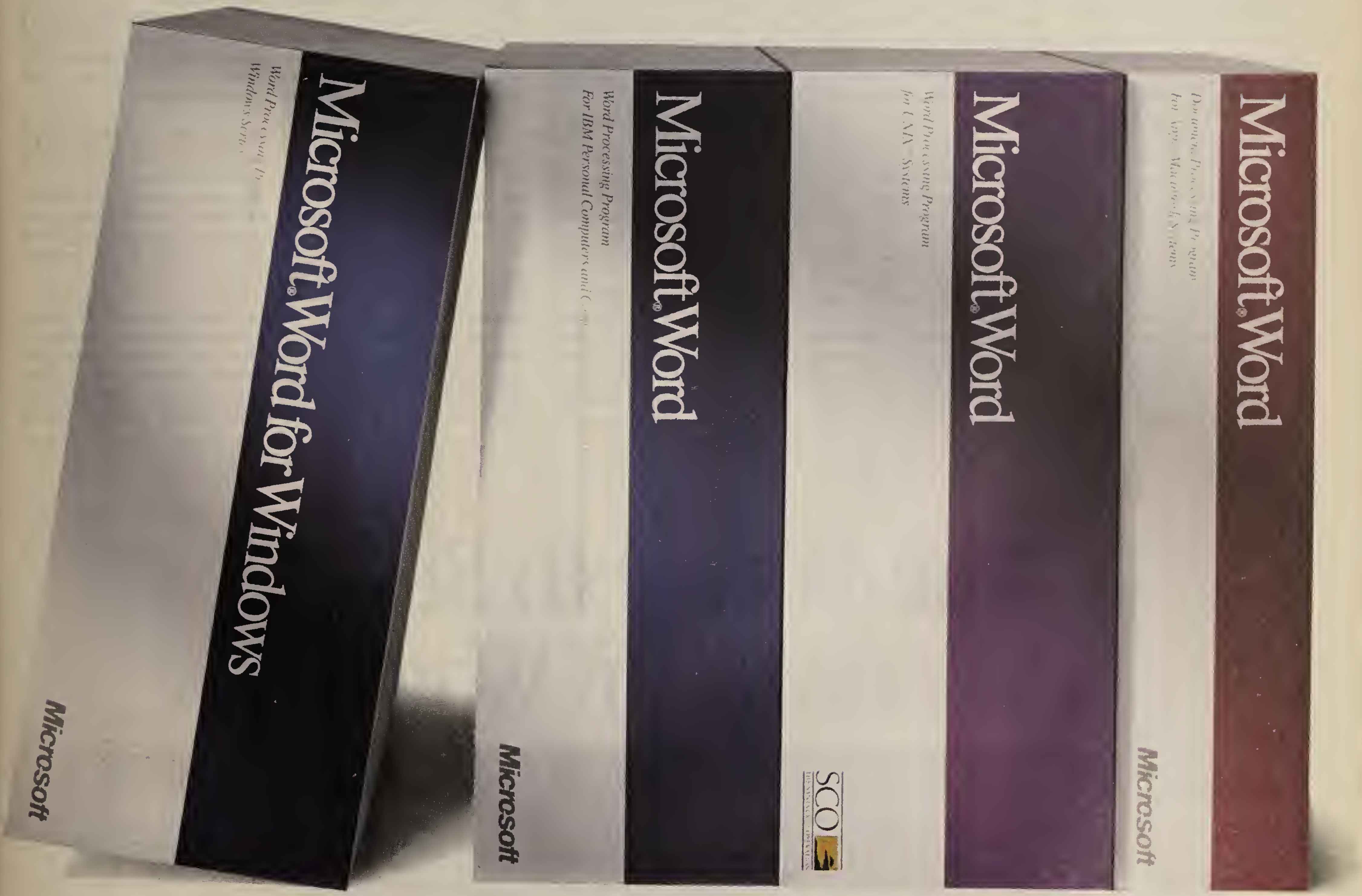
We don't know about your family, but members of the Microsoft® word processing family share some rather attractive characteristics.

Simply put, they work alike. Every Word program comes with a complete set of high-end features that are not only consistently implemented, but consistently easy to use. So by standardizing with us, your users are assured of outstanding performance on every platform. We've even developed an OS/2 version, which is due to ship shortly.

Furthermore, you won't find any sibling rivalries within the Word family. They read and write to one another, as well as applications from other software companies. Which makes file

Customers inside the 50 United States, call (800) 541-1261, Dept. K97. In Canada, call (416) 673-7638. Outside the U.S. and Canada, call (206) 882-8661. *© 1990 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and Making it all make sense is a trademark of Microsoft Corporation.*

Or a blessing.



sharing a possibility. And increased productivity a reality. Other shared traits include styles, glossary and outlining features. So you can establish consistent standards throughout your entire corporation.

Of course, adopting our family also benefits you. Training will require less of your time. And transitioning users from one hardware platform to another will be much easier, too.

For a free white paper on word processing, call (800) 541-1261 and ask for Department K97. As far as families go, it wouldn't hurt to look at ours.

Microsoft
Making it all make sense

INTERVIEW

Let your digits do the walking

At AT&T, the corporate network has been turned into an informational crossroads, where those in need of answers can consult a database that directs them to experts as well as a variety of other information sources.

Four years ago, the organization developed what it calls a "network of competitive analysis systems," which employed a locator database to give network users pointers to caches of product and market information. Since then, AT&T has built two similar "virtual databases" on its network: one to be used for data center operations and one for sales tracking and order processing.

Computerworld Senior Writer David Ludlum recently discussed the competitive analysis network with Martin Stark, a strategic planning manager in AT&T's Corporate Strategy and Development organization. Formerly a systems engineer at Bell, Stark is charged with industry analyses, competitive assessment and strategic planning.

The network has been referred to as a "virtual database." What does that mean?
It's a directory of where to find information. It's not unlike a corporatewide data dictionary except that it's really a subject matter expertise dictionary.

Instead of trying to collect all the data in one place, we decided to let the people who have specific information and expertise manage the data and build a central system that simply tells users where to find what they need.

Do the users have direct access to the databases of the subject matter experts?
That's answered on an individual basis because of the fact that there are a lot of security concerns. There's really no general answer.

Was there concern about sharing the information on the part of the people who own the data?
There's certainly concern to the extent that there are security issues and you want to make sure there's a legitimate business need. And that would be true even if there weren't such a system.

Could you describe how someone would interact with an expert?
He could interact by E-mail as well as by telephone or fax. For example, if somebody has a question about a competitor or product area, he can use the system to pull up a list of names of subject matter experts who know about that product or competitor.

Once he has that list, he can send them all a mail message; you just type it in once, and it then gets distributed to all of those people electronically. That's a very quick way to communicate with a lot of people.

In the same way, if someone learns something that others would find useful, he can also get the information out that way. Some people have used the system to develop distribution lists for documents.

The core system includes a thesaurus. What does it do?
That is a software table in a relational database to make the searches less dependent on specific terminology. If somebody is looking for information on microcomputers, they'll also find experts on PCs and maybe workstations. That helps people find the information they're looking for independent of the terminology they're using.

Who originally came up with the idea for the network?
It really just evolved out of the nature of our work. We have always been a resource, directing people to information. It wasn't really one person's idea.

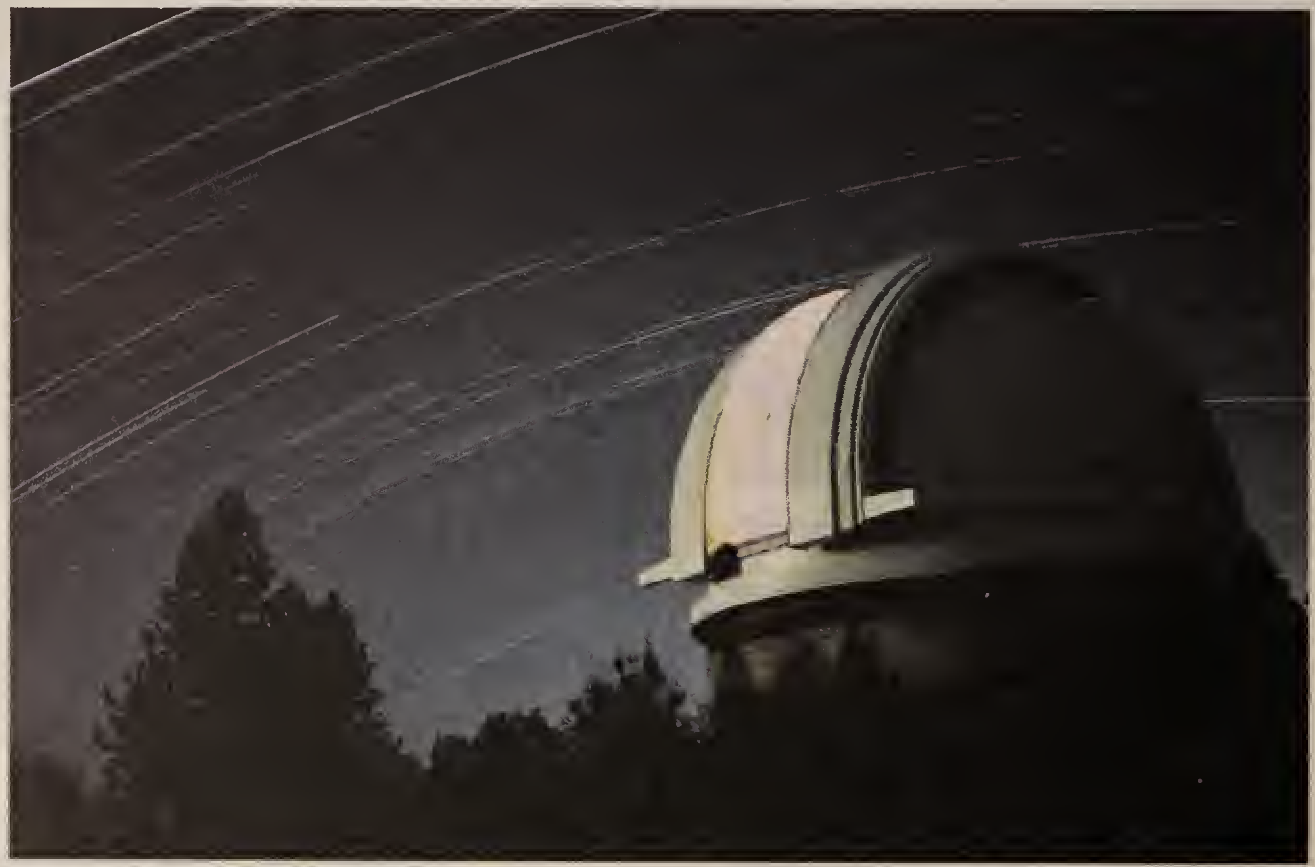
Did you consider developing a more conventional database?
We briefly examined that alternative. It turned out to be unwieldy because of the volume of information we'd need, the difficulty in keeping it to up-to-date and the fact that a lot of it would never be used.

From a strategic planning point of view, the set of questions we have is varied and diverse; we rarely get the same question twice.

Have you centralized any information in conjunction with the project?
We've centralized virtually nothing. We let the subject matter experts keep their own data. All we ask is the right to talk to them about it when we need it.

Is there interest in more centralization of the data?
No, I don't think so. I think that there's interest in cross-database applications where that makes sense. I would suspect

The Power to See
Outside Your World.



With its 200-inch telescope, one of the largest in the world, Mount Palomar Observatory can focus on stars not visible to the naked eye.

that as more of the information is stored in relational form, cross-machine and cross-boundary joins will be appropriate.

How many databases are involved?
That's a tough question to answer. It depends on how you define a database. There are well over 1,000 subject matter experts, some of whom have multiple databases and some of whom you could argue don't really have a database.

Are there also directions to hard copy files or volumes in the corporate library?
Yes, there are.

Which staff members use the network?
The people who use it are all over the company, which has 280,000 employees. They range from salespeople to engineers to market planners to product developers, including strategic planners.

Do you measure how much the system is used?
Yes, we have extensive measurements on that. We also have measurements on what people are doing with it. We're doing a lot of transaction logging.

Could you give me some numbers?
There are hundreds of uses per month, but that's only direct and measurable usage. There are lots of indirect uses of our network. Somebody uses the system and finds some contacts and some data. They may then talk to the experts and get involved in a project and draw more people in, not necessarily going through our network.

We also have what we call passive users. That is, the system has ways of alerting people to additional information sources on subjects that they've indicated they're interested in. So it's kind of an active system. That messaging is all done by E-mail, and it happens automatically. People give us certain keywords that they want to be kept informed about, and we keep informing them for as long as they like.

Have you ever been asked to demonstrate quantifiable benefits?
We haven't quantified the benefits. We've been asked to describe to some of our senior officers the approach we take in solving some of the problems. We described our approach, and they liked it and encouraged us to do more of it, because what we're doing is making more efficient use of company resources and expertise. And that's clearly a good thing.

AT&T has been through a lot of downsizing, and one of the things that it has done is make people more conscious of the need to make good use of all available resources. And that's exactly what we're doing here — we're sharing across boundaries.

John Martini

Stark *says 'virtual database' makes efficient use of AT&T's resources*

What role did IS people play in tying things together?
They provided us with the platform to build on, including the database [of experts], and they developed the application software.

How much development work was involved?
All of the hardware and software that we're using is AT&T's. Some is product and some of it is proprietary.

However, not a lot of our software is custom-designed for these applications; we're reusing software. Obviously, there is some application-specific work going on.

How long did the project take to complete?
The first prototype was released after four to six weeks of effort. We've gone through a couple of versions; I guess we're about to have our third major release sometime this summer.

After about two years, we redid the system, and that was probably several months of development effort. Now it is two years later again, and we're working on our third version, which is probably also going to take a couple of months.

Of course, there have also been continual improvements all along the way.

Who maintains the network?
The network is maintained by the corporate information management organization.

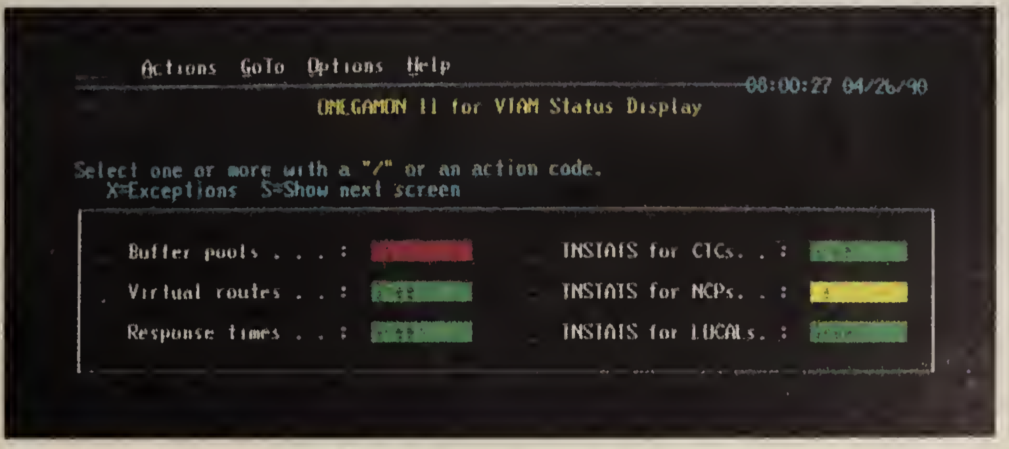
I suppose a network like this is only feasible for companies with the right databases in place.
Yes, but I would say that every company has that. The form of the database may vary from being a spreadsheet to something more sophisticated.

We're really interested in people and what they know more than in just the information itself; those people can help others use the information.

You can gain access to some data point — you pull out a number — but that number doesn't mean a lot until you get somebody to tell you what it means and how it compares and how it's been changing and why it's measured this way and so on and so forth. That's what makes that number useful. •

The Power to See
Inside Your Network.

Knowledge is power. When there's a slowdown in VTAM, response time can keep your users from getting their jobs done. They expect you to fix it. But to do that, you need to pinpoint the source of the slowdown. OMEGAMON® II for VTAM gives you that knowledge. Our early alert exception analysis tells you when a problem is beginning to brew and precisely where. 'Meantime to repair' can be drastically reduced from weeks to hours, from hours to minutes. So you're well into the solution by the time the users call - if they have time to notice a problem at all.


```
   Actions  GoTo  Options  Help
                                                 08:00:27 04/26/90
                  OMEGAMON II for VTAM Status Display

Select one or more with a "/" or an action code.
  X=Exceptions  S=Show next screen

    Buffer pools . . . :            INSTATS for CTCs. . :
    Virtual routes . . :            INSTATS for NCPs. . :
    Response times . . :            INSTATS for LOCALs. :
```

OMEGAMON II for VTAM focuses automatically on network hot spots.

With OMEGAMON II for VTAM, you benefit from:

- Immediate problem detection
- Faster problem resolution
- Maximization of network capacity
- Improved network throughput.

Increase your power in the data center by improving your knowledge of VTAM. Call **(800) 843-3970** today and ask for Department 701C.

Candle
Raising knowledge to the highest power.
Copyright © 1990 Candle Corporation.

KEEP THIS TO YOURSELF.

Computerworld is not the kind of publication you can afford to share with every person on your company's routing list.

Especially if it's in alphabetical order and your name begins with X, Y, or Z.

That's why you need your own subscription. So you'll be among the first in your company to get the most important news in the IS industry — hot off the press.

Order *Computerworld* now and you'll receive 51 information-packed issues. Plus you'll get our special bonus publication, *The Premier 100,* an annual profile of the top companies using information systems technology.

Each week *Computerworld* is filled cover to cover with up-to-the-minute articles on topics ranging from products and people to trends and technology. It's everything IS professionals like you need to know to get an edge on the competition.

However, you certainly don't want to share your copy with anyone in your office. Let alone that certain know-it-all who always beats you to *Computerworld.*

So why not use the postage-paid subscription card bound into this issue to order your own copy. Then keep it to yourself.

The Newsweekly of Information Systems Management

YOU'VE READ THE REVIEWS ...... NOW JUDGE FOR YOURSELF

s twelve volume library of the world's leading mainframe development tools shows their unique blend of CASE / 4GL / DBMS in action. Each volume illustrates step y step the solution process to a standard case study. Aimed at IS managers, developers, consultants, system houses, vendors, and educational institutions the library demonstrates the capabilities of the products. It provides an in-depth illustration of their form, style, and level of integration with working examples exhibiting the differences in software development technology. Compiled independently by U.K. based consultants Computing Futures Ltd, it brings for the first time a comparative analysis based on actual performance. The special Computerworld reader subscription price for a set of twelve monthly delivered volumes is $2250, and specially reduced for educational institutions to $1575. Individual copies may be obtained at $500 (prices exclude postage and packing). You can also FAX your order on (508) 820-0146.

orld Leaders
action
Y 90 PREDICT CASE / NATURAL / ADABAS
N 90 NOMAD
90 CA-IDEAL / CA-DATACOM / DB
G 90 FACT / FOCUS
P 90 IEW / MANTIS / SUPRA
T 90 Design Assistant / LINC / DMS II
V 90 SAPIENS (new innovative tools)
C 90 EXCELERATOR / CSP / DB2
91 ORACLE CASE / SQL
91 PRO-KIT / PRO-IV / DB2
R 91 IEW / Application Development Workbench
R 91 IEF / DB2

uct names mentioned are trademarks of the respective holders. lishers reserve the right to substitute vendors or alter schedules out notice

DEVELOPMENT WORLD LIBRARIES

☐ Enrol my company and invoice us for ______ sets
☐ Educational institution ☐ Send me a brochure
☐ Single volumes. State month ______
☐ Charge my credit card for $ ______ (plus P&P)
☐
☐ Expiry date ______
☐ Non-corporate card holders should also show full home address overleaf.

Name ______ Mr / Ms / Dr
(BLOCK CAPITALS)
Title ______
Company ______
Address ______
City ______ State ______
ZIP ______ Country ______
Phone ______ Order ref ______
Signature ______
Date ______ ☐

Home address ______________________

____

____

____

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO.1126 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

DEVELOPMENT WORLD LIBRARIES
TEN SPEEN STREET
FRAMINGHAM
MASSACHUSETTS 01701-9508

Avoiding hidden EIS pitfalls

A case study: What you see isn't always what you get

BY HUGH WATSON

How many things can you find wrong with this true-to-life scenario?

Bill Perry, vice-president of information systems at Genericorp, had advocated the development of an executive information system (EIS) to support the information needs of the firm's senior executives. From trade writings, conferences and conversations with other information systems managers, Perry had heard of EIS successes at firms such as Xerox Corp., Phillips Petroleum and Lockheed-Georgia. Perry believed that besides helping top management, an EIS would also improve the image of the IS department. For too many years, company executives had approved multimillion-dollar budgets without much IS support. An EIS would change that situation, however.

Perry arranged for one of the EIS vendors to present a demonstration to the chief executive officer and other senior executives. The demonstration was very well received. With a touch of the screen, charts and reports quickly appeared in a rich variety of formats and colors. The executives were impressed and, after a brief meeting, authorized the development of an EIS. The project was allotted a budget of $250,000.

The next step was to put together a team of people to develop the EIS. Sam Johnson, who had worked at Genericorp for 20 years in a variety of areas, was recruited to head the project. Johnson was a good choice because of his knowledge of the business, executives and politics of the organization. Perry also assigned two of his best systems analysts to the project.

After reviewing the software and hardware alternatives, the EIS team chose what they thought would be a good approach. A major EIS vendor's software would be used. The product was designed around the coprocessing concept, in which the personal computer performs graphics functions and the mainframe handles data storage. The executives would have IBM Personal System/2 Model 50 machines connected to an IBM 4381 by a Token-Ring network. Most of the hardware was already in place.

Getting the initial set of executive users to specify their information requirements proved to be a problem. The EIS staff found it difficult to arrange time with the executives because of the latters' travel and job requirements. Even when they did meet, the executives were often vague and uncertain about their information needs. Consequently, the executives' staff and secretaries became important sources for determining what should go into the EIS.

Three months later, the initial version of the system was rolled out to five users. The 50 screens provided key financial reports that were previously available only in paper form. The system also provided information on key performance indicators that had been identified in Genericorp's strategic planning processes. The screens were efficiently updated by automatic downloading of data from existing databases.

The executives' initial reaction to the system was generally positive. One executive said, "I've never been able to get my hands on this information this quickly before." Several of the executives seemed proud to finally be able to use a computer. Only one older executive seemed to have little interest in the EIS.

Having delivered the system, the focus turned to maintenance. Johnson was assigned to another project. The systems analysts were given responsibilities for developing a new, important transaction processing application. Two maintenance programmers were assigned the task of handling the evolution and spread of the system to more users, with additional screens and new capabilities.

Little happened with the system during the next few months. It took the maintenance programmers a while to learn how to use the EIS software. Even after they knew how to develop screens, the programmers discovered that this activity always seemed less critical than working on other applications. Besides that, the executives seldom requested additional screens. To some extent, the maintenance programmers viewed the EIS as an "executive toy."

Nine months after the introduction of the EIS, little evolution had occurred. There were no new users, and usage-tracking software revealed that three of the five

Bethany Gully

• Projects can start rosily but fade quickly

• Well-planned evolution is key

• Strong ongoing support also needed

Watson is Director of MIS Programs at the University of Georgia's College of Business Administration in Athens.

executives were not using the system at all. Few new screens had been added, and there were no new system capabilities.

At about this time, Genericorp began to encounter financial troubles. To maintain a healthy bottom line, any nonessential expenditures were eliminated. At a key meeting, the executive who had never taken to using the EIS proposed that it be terminated. "We've put a lot of time and money into this system, and I don't see that we have gotten much out of it," he said. "If we are honest with ourselves, all we are getting is the same information that we used to get before — except now it is on a screen with fancy graphs and colors. We can save money by trashing the system and not lose much." After discussion, the executives agreed that the system had turned out to be a disappointment that should be scuttled.

When Perry learned of the decision, he was crushed. The EIS had seemed so promising, and things seemed to have been going so well. What had gone wrong? He'd gotten executive support, assembled a good staff, selected appropriate hardware and software and quickly delivered an initial version of the system. These were frequently mentioned keys to success. Maybe the executives just weren't ready to use computers. One thing Perry did know, however, was that the EIS experience smeared his reputation, as well as that of his department.

While the scenario and company are fictional, the situation is very much like the EIS experiences of many firms. An EIS is developed with high expectations, but it often ends in failure.

What went wrong?

The Genericorp scenario has many problems in it. The longer you look, the more faults you find. Some problems are not fully appreciated even by experienced EIS developers. Taking a look at the following problems can help you steer your organization away from an EIS failure.

- **Problem one: Lack of executive support.** Conventional wisdom says that an EIS requires an executive sponsor. This person supports the project, makes the necessary resources available and handles the political problems that occur.

In the early days of EIS (from the late 1970s to the mid-1980s) senior executives tended to drive EIS development. They had a specific information need and thus a strong interest in EIS. More recently, IS managers, sensing a chance for increased visibility and recognition, began initiating interest in EIS. Although they may get executive support, that support is weaker, and as Genericorp learned, there is a difference between support and commitment. Come economic hard times, the system may be abandoned.

There is another reason that an EIS should have a broad base of executive support. More than one EIS has failed after the executive sponsor left the company. The highly touted EIS at Northwest Industries died after Ben Heineman left. When the EIS has multiple supporters, it can better withstand the loss of an executive sponsor. Having a broad base of support requires the creation of a system that meets the needs of many users.

- **Problem two: Undefined system objectives.** There can be a variety of motivations for creating an EIS. A firm's executives may need information that is more comprehensive, relevant or timely. An EIS can be used to improve communication within an organization. It may be used to change executives' mental models: for example, how executives view the firm. It might be employed to analyze specific organizational problems.

> WHEN THE EIS has multiple supporters, it can better withstand the loss of an executive sponsor. Having a broad base of support requires the creation of a system that meets the needs of many users.

Many firms fail to clearly define the objectives for their EIS. One outcome is that the system may lack needed features and capabilities. An otherwise excellent EIS that does not serve its intended purposes is likely to fail. At Genericorp, system objectives were never clearly defined, thus contributing to the failure.

Early in the development of an EIS, it's important to assemble key executives and clearly define why the EIS is being developed. A clear purpose suggests the capabilities and features that should be included in the system. Some organizations have used an EIS executive steering committee with good success to not only define system objectives but also provide on-going planning and control for the project.

- **Problem three: Poorly defined information requirements.** Most organizations know that an EIS should supply relevant information that will aid success. Less obvious are some subtleties and potential problems that need to be understood and addressed when designing an EIS.

There are four basic types of critical success factors: industry, organizational, work group and individual. In mining, for example, key factors include world demand and price for tin, copper and other metals. These factors remain relevant over long periods of time. Organizational factors differ by company. These might include the market share for tin or the cost per ton for extracting copper. Such factors are relatively stable over time. Work unit factors apply to the division, group, department or other organizational unit. Examples might include the number of accidents per month or the number of tons of tin produced per day. Such factors are stable only as long as the responsibilities of the work unit remain the same. They are also unique to the work unit. Finally, individual factors are things that the executive must do well in order to be successful. These factors tend to change relatively quickly as job responsibilities and concerns change and are unique to the particular executive.

Information about industry and organizational success factors tend to be available to all EIS users. (One exception might be sensitive competitive information that only a few executives can access.) Work unit and individual critical success factor-related information is usually of interest to only a few or perhaps even a single executive.

Most organizations take one of two approaches when designing the initial version of their EIS. The first approach is to *focus on the executive sponsor's information needs.* This approach is logical because it reinforces the interest and commitment of this key person. The type of information provided is likely to vary considerably. It will include industry, organizational, work unit and individual critical success factor-related information. A problem with this approach is that it does not build a broad base of support. Thus, it is critical to expand the information provided by the EIS so that it meets the information needs of more users.

The second and most common approach is to focus on *providing key financial and strategic information.* This was the approach used at Genericorp. Once again, this seems to be a logical approach because it provides information that senior management needs to run the business.

This approach runs the risk, however, of what may be called "the six-month phenomenon." For the first six months, everything seems to be going well, but then executive use of the system starts to decline. As was the case at Genericorp, the system may even be discontinued. The problem is often that the information provided does not grow in depth or breadth. This type of system may not allow executives to drill down to the level of detail needed. It may provide information about only a few of the areas that are important to users. Very little, if any, information is provided about work unit or individual critical success factors. After a while, executives perceive that the EIS is satisfying only a small percentage of their information needs and that it is unlikely that the situation will change. Enthusiasm and interest in the EIS decrease, use of it declines and the system is terminated.

Even when the EIS support staff realizes the importance of providing individual success factors-related information, there are problems when users are

How to design a system that gets used

Among the many sins in developing executive information systems, probably the biggest is building a system that doesn't meet user needs. The following techniques can be valuable tools in helping you develop EIS requirements:

- **Participating in strategic planning meetings.** Get EIS support personnel active in the organization's strategic planning sessions. This approach — which requires strict confidentiality by the analyst — is especially useful in identifying industry and organizational critical success factors (CSF). If it's not possible for an analyst to attend meetings, a representative from the strategic planning group can brief the EIS support staff.
- **Formal "success" sessions.** This method is often advocated for use with EIS. Sessions are held in which the focus is to identify organizational goals, as well as the underlying CFSs. These sessions can help members explore ways to measure CFSs and devise ways to deliver key information to support these factors. This approach is highly appropriate for identifying organizational CSF-related information requirements.
- **Informal discussions of information needs.** This is probably the most useful method for determining information requirements. Moreover, its usefulness tends to grow over time, as the analyst comes to better understand the executive's job, problems, sources of information and management style. Placing the analyst as physically close to the analyst as possible increases opportunities for executive/analyst interaction.
- **Tracking executive activity.** In this approach, the analyst spends several days with the executive to better understand his job and information needs. Alternatively, the executive or his secretary can keep a log of daily activities and information requirements. This method is especially helpful for understanding individual needs during the early stages of EIS development.
- **Discussions with support personnel.** Because executive time is at a premium, analysts must typically rely on support personnel for insights about information requirements. Secretaries and staff assistants are good candidates.
- **Reviewing computer-generated information.** Most executives receive a plethora of computer-generated information; some is useful, but the rest may be too old, inaccurate, not at the right level of detail, irrelevant or presented unappealingly. The analyst should meet with the executive to determine what information is useful and what needs to be changed or included.
- **Reviewing noncomputer-generated information.** Most executives use information from newspapers, journals, trade publications and other sources. It's helpful for executive and support personnel to identify what information is regularly gleaned from these sources.
- **Attending meetings.** Having EIS analysts sit in on areas they support, such as finance or marketing, can help provide a good understanding of the unit and its information needs.
- **Software tracking of EIS usage.** Some custom-built EIS systems and commercial software let analysts monitor executive EIS use. This capability gives analysts the ability to track system usage and problems, which provides insights into how the system could be improved in the future.

HUGH WATSON

EXCITING NEWS FOR ISVS!

THIS YEAR, THE UNIX® MARKETPLACE IS WORTH ALMOST $17 BILLION. AND, IN THE NEXT TWO YEARS, THE CUSTOMER BASE WILL DOUBLE TO TWENTY MILLION BUYERS. IS IT ANY SURPRISE THAT DEMAND FOR UNIX SYSTEM V RELEASE 4 APPLICATIONS IS AT AN ALL-TIME HIGH? THE 160 MEMBERS OF UNIX INTERNATIONAL ARE SPONSORING AN INDUSTRY-WIDE ISV PROGRAM THAT CAN HELP YOU MOVE YOUR APPLICATIONS FROM YOUR PRESENT BASE TO UNIX SYSTEM V. THEN YOU CAN TARGET THIS LUCRATIVE MARKET FOR YOUR APPLICATIONS. OUR WORLDWIDE PROGRAM INCLUDES SEMINARS, MIGRATION GUIDES, TRAINING, TECHNICAL SUPPORT, EQUIPMENT, SALES SUPPORT, AND MUCH, MUCH MORE. TO PARTICIPATE IN THE UNIX SOFTWARE BOOM, CALL 1 800 848-6495, EXT. 555.

UNIX
INTERNATIONAL

© 1990 UNIX International. UNIX is a registered trademark of AT&T in the U.S. and other countries. UNIX International is authorized by AT&T to use UNIX in its name

"WE'RE COMMITTED," WE SAID.

"PROVE IT," YOU SAID.

Well for a start, we've just added two new top-end mainframes to the growing list of advantages from Hitachi Data Systems.

The new EX models 310 and 420 bring as much as a 70% increase in the performance range over our current top model, the EX100. They're a natural extension to the already broad EX line, designed for easy upgradability in step with the growth of your business.

Many of our customers weren't entirely surprised. One year ago, when we became Hitachi Data Systems, we committed to maintain our record for superior reliability while building additional advantages into our product lines. Most people just didn't expect such a big advantage.

This last year we also introduced two top-end intermediate-range computers to increase our customers' growth alternatives and performance options. We added significant improvements to our direct access storage systems, even though they were already recognized as the world's most reliable. Our parent company, Hitachi, Ltd., committed $2.8 billion to R&D, mostly computer-related, and reinvested all of our earnings into growing our business.

The results of our commitment so far? We gained more than 200 new customers, increased our worldwide staff by 15% and enjoyed a revenue increase of 30%.

And we're still gaining speed. Because when it comes to commitment, we have to do more than just prove it. We have to improve it.

Hitachi Data Systems, 750 Central Expressway, P.O. Box 54996,
Santa Clara, CA 95054-0996. Tel (408) 970-1000.

HDS

Hitachi Data Systems

unwilling to commit the time to discuss their information needs. While executive support personnel can provide important insights about what information is required, regular interaction with the executives makes it not only possible to respond to information needs but also to anticipate them.

A portfolio of methods should be used to identify information requirements. Some of the methods involve direct interaction between executive users of the system and the EIS support staff. It is seldom possible to get as much executive time as wanted. Consequently, analysts must use indirect methods, such as discussing executives' information needs with support personnel.

All these methods merit consideration. Those used will depend on factors such as how accessible the executives are, the relationship between the analysts and the executives, whether the information requirements are for the initial or ongoing version of the system, the level of the success factors-related information that is needed and the software used.

It is important to recognize that multiple methods are needed, because no single method is likely to serve all purposes.

• **Problem four: Inadequate support staff.** A good EIS support staff is critical. Genericorp got off to a good start by naming Johnson to direct the project. He knew the company, the executives and the politics. He was well regarded and had the requisite business, technical, managerial and interpersonal skills. His staff was also first-rate.

The staffing problems began when people started to think that the EIS could be placed in a maintenance mode, like most other applications. An EIS needs to spread to additional users, accommodate new and changing information needs and evolve to provide additional capabilities. These requirements demand a permanent staff that promotes the EIS, interacts often and effectively with executives, understands and anticipates information needs, has a vision of what the EIS can be and is ready and able to overcome problems when they are encountered.

EARLY IN the development of an EIS, it's important to assemble key executives and clearly define why the EIS is being developed.

Even though EIS support staffs can be assembled in a variety of ways, three organizational roles must be filled. *Technical supporters* must perform tasks such as testing and installing hardware, handling communications needs and writing data extraction routines. Such people typically come from IS, whether they are permanently assigned to the EIS support staff or have a dotted-line relationship to it.

Another role is filled by *business information analysts.* These people perform tasks such as identifying information needs and designing displays. They must work closely with the executives and may even have been the staff that supported the executives before the EIS was created.

The final role is the *data provider.* These people obtain data and enter it into the EIS. This role is often performed by functional area personnel, including secretaries.

In our case, Genericorp created a permanent EIS support staff that was unable to perform the business information analyst role. Their organizational location, training, experience, other job responsibilities and attitudes made them terrible choices for providing long-term EIS support.

• **Problem five: Poorly planned evolution.**
The initial version of an EIS can take many different forms, depending on the motivation for creating it. The EIS at Genericorp provided financial and strategic information. The initial version may provide information about an important problem. It may focus on communications support. There are many legitimate starting points, depending on the company's needs.

Regardless of the starting point, there should be a plan — or at least a planning process — for the evolution of the EIS. Genericorp had neither. Ideally, an EIS planning committee includes the operating sponsor, executive users, EIS support staff manager and IS personnel. Their purpose is to give direction to the EIS.

To maintain executive interest in the EIS, evolution must occur quickly. Changes and enhancements must be made almost daily. The EIS at Genericorp was in trouble when months passed while the new support staff learned to use the software. Even then, little change was forthcoming.

An important part of the evolution of an EIS is to ensure that it helps address significant needs or problems. The information and capabilities provided should make a real difference in the performance of the organization. Efforts should be made to assess tangible benefits from the EIS. Without this, the EIS is at risk from economic hard times (as was the case at Genericorp), turnover of the executive sponsor and political resistance.

When an EIS is successful, it almost always expands to other users. The spread can be lateral to different areas of the firm or downward to lower organizational personnel. Other people want to have access to information on which important decisions and actions are based. Priorities for the spread of the EIS should be governed by the areas of greatest need.

Ultimately, the EIS may serve everyone in the organization. Having relevant information that is easily accessed is appealing to more than just the senior executives of a firm.

Epilogue: Is it worth doing?
For most organizations, an EIS is a high-risk application. It serves users who have poor computer skills and are skeptical about whether computers can help improve their job performance. Organizations often have little experience in developing applications of this kind. An EIS often involves learning, selecting, implementing and using new technology. Additional data sources typically have to be used. Potential political problems abound.

So a logical question is, is it worth the trouble? For many organizations, the answer seems to be yes. Providing information that is more comprehensive, consistent across the organization, relevant and timely has value. It lets organizations communicate better, especially when units are separated by time and distance. The perspective and information presented by the EIS focuses attention on those areas that are judged to be important. An EIS can improve the productivity of individuals and groups, thus enhancing the productivity of the organization. An EIS can reduce costs by facilitating the reduction of systems (for example, systems for developing executive-quality presentation materials), staff personnel and management personnel.

IS managers who successfully develop an EIS also benefit. They are afforded the opportunity to work with leading-edge technologies. An EIS provides more visibility with top management than almost any other kind of application. A successful EIS typically results in greater management satisfaction with IS. In some firms, the system has helped IS management join the select group of senior executives who determine the strategic direction for the firm. It could happen to you. •

Think! Develop a winning EIS mind-set

BY ERIC GOLDFARB

An EIS implementation should incorporate the following steps:

1. Think clearly. Make sure you have clearly defined business objectives. An EIS is only as good as your up-front planning.

2. Think promotion. Actively encourage top executives to promote access of your EIS. In the most successful organizations, management is 100% behind the project.

3. Think balance. Make sure the EIS is flexible, but remember to control user expectations.

4. Think long term. Be willing to invest in the future. Competitive companies are willing to pay now to achieve future competitive advantage. The EIS will never be a quick fix for strategic problems. Help develop and reinforce a corporate culture that promotes a long-term view of EIS.

5. Think one at a time. Forget feasibility studies. Instead, use a prototype and champion approach. A champion who understands benefits is a powerful force. A prototype gives the champion a great tool to sell the EIS concept to top executives.

6. Think realistically. Remember, "the rich get richer." Using an EIS, well-managed companies tend to get better, whereas poorly managed companies tend to get worse. An EIS is not a replacement for poor systems.

7. Think ownership. If the EIS distributes a sales report, let the originator "own" the report even after it's on the system. Owners should be able to ensure accuracy and integrity. Permitting ownership fosters teamwork and promotes the idea that the EIS is a cooperative system.

8. Think of an EIS as electronic glue. In decentralized companies, EIS is a key tool for managing interdependence in decentralized companies.

9. Think strategy. EIS makes everyone a strategist. In the early days, the EIS was valued as a means of decreasing costs and improving productivity. More progressive organizations have come to see that an EIS gives every knowledge worker a chance not only to solve his own problems but to actually help define new lines of business and how to pursue them.

10. Think about recycling. When aggressive companywide efforts bog down and get too expensive, many organizations can get big benefits from improving an existing EIS.

11. Think flat. Big EIS investments without concurrent organizational change are unlikely to produce any good results. Information shapes organizations. Work with top management to retrain people and restructure operations as necessary.

Goldfarb is a senior systems engineer at Lintas: CECO Communications in Warren, Mich.

Get The Best...
DISTRIBUTION SOFTWARE
•ORDER PROCESSING • INVENTORY MANAGEMENT
•PURCHASING • GENERAL ACCOUNTING

4300 TO AS/400 SPECIALISTS

When your President says:
"I want software that supports...

....and I mean really supports: Fast and accurate order processing • Multi-company • Multi-warehouses • Bar coding • Telemarketing • Cycle counting • Serial numbers • Lot tracking • Item substitution • Future orders • Warehouse mapping • Unit of measure conversions • Kits • Quotations • Wave picking • Promotions • Customer contracts • Forecasting • Importing • Exporting • Threshold buying using order points and line points...*In other words, everything we want to do here."*

CALL 1-800-729-7950

BCA BUTLER & CURLESS ASSOCIATES, INC. BCA
7610 Falls of the Neuse Rd. • Suite 270 • Raleigh, NC 27615

AS/400 and SYS/38 are registered trademarks of International Business Machines

Because the data you need isn't always blue.

You've worked hard to create a powerful IBM® network. Now your users want the same kind of easy access to non-IBM data sources.

Legal needs access to LEXIS® Engineering needs quality assurance data from an HP on the factory floor. R&D wants to work with a database supported on a public network.

What's the answer? More PCs and modems? More dial-out charges? More time consuming, awkward connection procedures?

LEGENT has a better way. STX™. A unique software solution that provides easy access to non-IBM data sources with a single keystroke from an ordinary 3270 terminal.

With STX, users simply select the sources they need from a menu screen. Sources such as DEC's All-In-1 or a Hewlett Packard database. Public networks like Telenet™, Tymnet™, CompuServe™ or Datapac™. Public databases such as Dow Jones News Retrieval™ or LEXIS/NEXIS® And the list continues.

STX, for easy access to non-IBM sources.

STX automatically connects users to the information they need, without special hardware or awkward procedures. The result? Significant cost savings on hardware...and even more significant benefits in user productivity and satisfaction.

Access STX today and see what lies beyond the blue. Contact your local LEGENT account representative or call 800-323-2600 (412-323-2600 in Pennsylvania). Free 30-day trials are available for MVS and VM environments.

©1990 LEGENT
STX is a trademark of LEGENT.
IBM is a registered trademark of International Business Machines.
LEXIS and NEXIS are registered trademarks of Mead Data Central, Inc.
DEC and All-In-1 are trademarks of Digital Equipment Corporation.
HP is a trademark of Hewlett Packard.
Tymnet is a trademark of McDonnell Douglas Network Systems Company.
Telenet is a trademark of Telenet Communication Corporation (A U.S. Sprint Communications Company).
CompuServe is a trademark of CompuServe Inc.
Datapac is a trademark of Bell Canada.
Dow Jones News Retrieval is a trademark of Dow Jones and Company Inc.

LEGENT

NATIONAL
BRIEFS

Leaner? Maybe. Meaner? Yes

Infighting, backbiting and deficient accounting records are stalling Solano Beach, Calif.-based **Kaypro Corp.'s** efforts to reorganize under the protection of Chapter 11 of the Bankruptcy Code. Last week, in short order, the beleaguered firm reported the ouster of founder/controlling shareholder Andrew S. Kay; the loss of its stock exchange listing because of unfiled forms required by the Securities and Exchange Commission (SEC); an SEC request to see documents; and the outbreak of a power struggle.

……

Not-enough-Businessland

In the wake of strategic confusion and dwindling profits, **Businessland, Inc.** cut loose its two highest sales and marketing executives last week. The move, which the retailer reportedly said was not a slur on either former executive but rather an admission that their respective resumes did not fit their job requirements, struck some industry observers as a warning note: Businessland's forthcoming year-end earnings report, they said, could be scripted in red.

More briefs on page 95

U.S. waning, Japan gaining

'Ad hoc' industrial policy is hobbling hardware industry, Commerce report says

BY MITCH BETTS
CW STAFF

The U.S. Department of Commerce — despite its best efforts to comply with the White House doctrine against "industrial policy" — keeps issuing fact-finding reports that hand more ammunition to advocates of government support for high-technology industries.

The irony was evident in the agency's latest technology report, "The Competitive Status of the U.S. Electronics Sector," which warned that Japan is headed toward replacing the U.S. as the world's No. 1 producer and trader of electronics hardware by the early 1990s.

The report also said that, in the face of foreign industrial targeting, the U.S. government's "ad hoc approach" to technology policy has put the U.S. electronics industry at a competitive disadvantage.

The Bush administration supports government investment in generic technology research but opposes any kind of "industrial policy" that targets specific industries for government assistance. Bureaucrats that stretch the limits of that doctrine — for example, Craig Fields, former director of the Defense Advanced Research Projects Agency (DARPA) — have been forced out or silenced [CW, April 30].

Critics cited the electronics report, as well as a similar one on emerging technologies, as evidence that the Bush administration's technology policy is failing. "These reports by Mr. Bush's own Commerce Department clearly repudiate the troika's ideologically driven efforts to block government support for electronics and other leading-edge industries," said Lester Thurow, dean of MIT's Sloan School of Management.

Thurow and other members of a group called Rebuild America argued that the U.S. will become a second- or third-rate industrial power by the year 2000 under the laissez-faire economic policy shaped by three powerful White House aides: Chief of Staff John Sununu, Budget Director Richard Darman and Michael Boskin, chairman of the Council of Economic Advisors.

The Commerce Department's study, which was requested by Congress, said that if present trends continue, Japan will surpass the U.S. in electronics equipment production by 1994. It defined the sector as including semiconductors, computers and telecommunications equipment.

The U.S. industry got in this predicament for a variety of reasons, such as the relatively high cost of capital in the U.S., shortsighted business decisions and inattention to advanced manufacturing techniques, the report said. Also cited were foreign industrial targeting and unfair trading practices.

The good news is that the U.S. is still strong in software, workstations and mainframe computers, officials said. Furthermore, the U.S. "has a lot of talent and resilience" and a strong university/research base, added John E. McPhee, director of the office of computers and business equipment.

The report called for enactment of several Bush administration proposals

Continued on page 94

Win, place, show

The U.S. electronics industry is still the biggest in volume, but South Korea's industry is growing fastest, and Japan's trade balance is the best

Electronics industry data (excluding software)	Top three countries (in order)
Production volume	U.S., Japan, EC**
Production growth*	South Korea, Singapore, India
Consumption volume	U.S., EC,** Japan
Consumption growth*	South Korea, India, Singapore
Exports	Japan, U.S., EC**
Export growth*	South Korea, Taiwan, Japan
Trade balance*	Japan, Taiwan, Singapore
Trade improvement*	Japan, Taiwan, South Korea
Employment	U.S., EC,** Japan
Technology base	U.S., Japan, France

*U.S. ranked low; 7th, 8th or 9th out of nine countries
**EC=European Community

Source: U.S. Department of Commerce

CW Chart: Marie Haines

See Us at DECWorld '90

THINK DIGITAL ◆ THINK ROSS

The best financial, distribution and human resource software for the Digital VAX™ system.
Call Ross today for more information: 415/593-2500, Ext. 173

ROSS SYSTEMS
THE DIGITAL STANDARD
555 Twin Dolphin Drive, Redwood City, CA 94065

digital Cooperative Marketing Program™

VAX is a trademark of Digital Equipment Corporation.

1989 digital review TARGET AWARDS WINNER
1990 digital review TARGET AWARDS WINNER

U.S. waning

CONTINUED FROM PAGE 93

— such as a permanent research tax credit and antitrust relief for joint production ventures — but said most of the responsibility for meeting the Japanese challenge lies with the private sector.

Juan A. Benitez, deputy assistant secretary for science and electronics, sternly rejected the notion that the government should provide the leadership; he said the government's role is to create a macroeconomic climate in which the industry can thrive.

Officials said the industry is also hampered by a lack of consensus on how to handle the competitive challenge, evident in the failure of the U.S. Memories, Inc. initiative [CW, Jan. 22]. "The private sector did not step up to the plate and make the commitment [to U.S. Memories]. . . . Why should the government do it?" Benitez said at a press briefing.

Asked about the government's ad hoc approach to technology policy, McPhee acknowledged that "we could be accused of taking a less-than-coordinated approach in the past, but that is changing" because the administration's trade and domestic policymakers are now meeting frequently.

McPhee said he is encouraged that business and government now fully recognize the competitiveness problem. "The problem-definition phase is over. Now people are really taking shots at doing something about it," he said.

A previous report, "Emerging Technologies," said the U.S. is falling behind Japan in 10 of 12 emerging technologies and is falling behind Europe in three areas. For example, it said the U.S. is "losing badly" to Japan and Europe in the field of digital imaging technology, which includes high-definition television (HDTV).

In a statement released with the "Emerging Technologies" report last month, Commerce Secretary Robert A. Mosbacher stressed that the intent of the report is to "continue our dialogue with industry, not prescribe a remedy. It's up to industry to take a lead on which technologies to pursue. Government's role will be to remove impediments."

When Mosbacher first came into office last year, he signaled support for a more active government role in the HDTV industry, but he later was persuaded by Sununu, Darman and Boskin to stick to the administration's policy.

OFFICIALS SAID the industry is also hampered by a lack of consensus on how to handle the competitive challenge.

Members of Congress, led by Sen. John Glenn (D-Ohio) and Rep. Richard Gephardt (D-Mo.), have proposed legislation to create a civilian version of DARPA that would share with industry the cost of high-risk technology research ventures such as HDTV. Several witnesses at a June 12 hearing endorsed the general concept but only if Congress makes sure the new agency's funding decisions are not influenced by politicians who are trying to shore up failing businesses.

Projects funded by the proposed Advanced Civilian Technology Agency "should always be designed to benefit the technology base of an industry or industries and not allowed to degenerate into a sophisticated form of pork barrel," testified Kenneth Flamm, a senior fellow at the Brookings Institution.

INTERNATIONAL BRIEFS

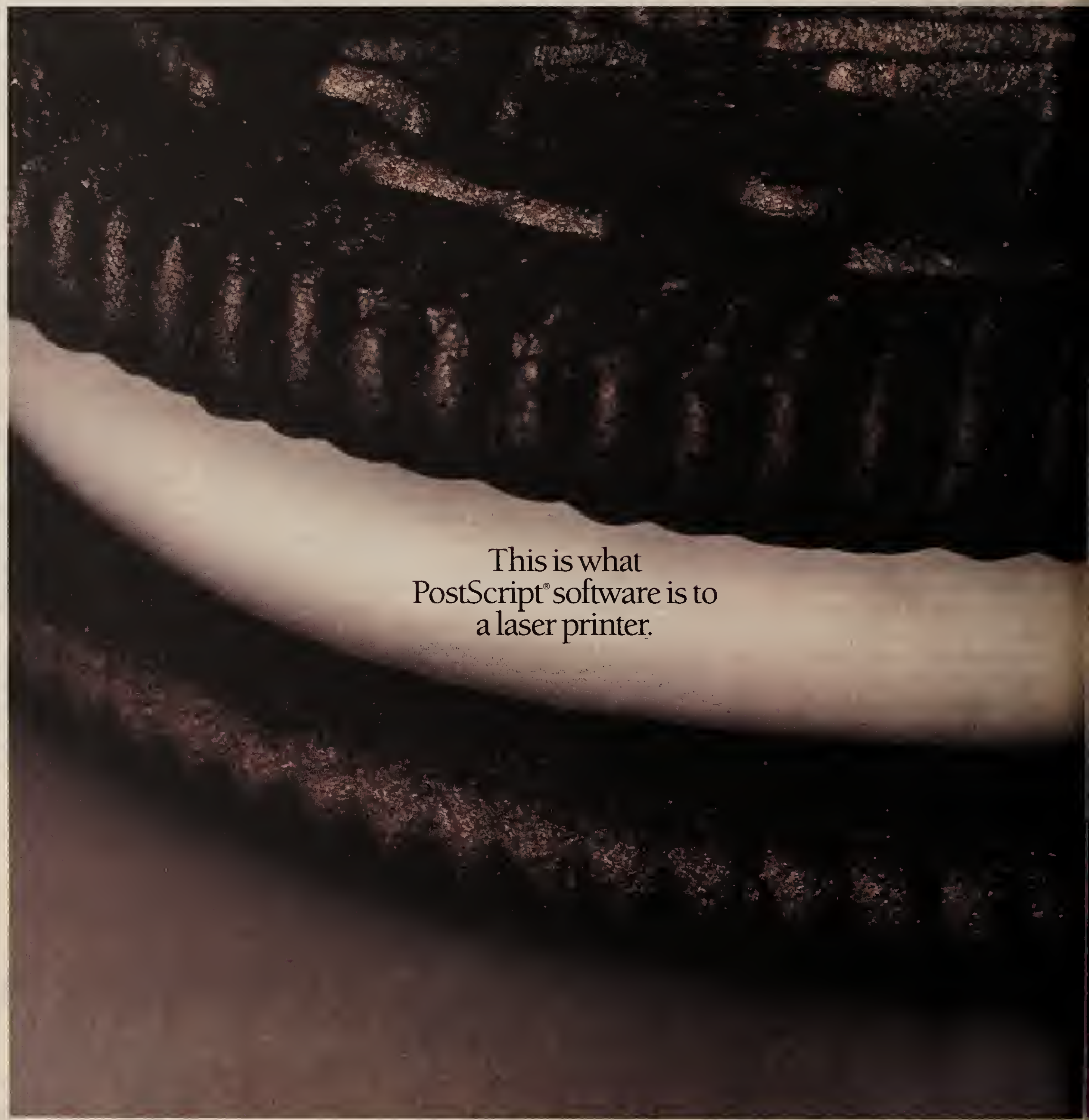
No go

The breakdown of information technology merger negotiations between Netherlands-based multinational **Philips NV** and Italy's **Ing. C. Olivetti & Co.** earlier this month is being viewed by analysts as a possible vote of no confidence in the Dutch company's computer business. While both companies declined to detail the proposals discussed at the now-terminated talks, one analyst speculated that the talks may have fallen through when Olivetti took a long, hard look at Philips' information systems division, whose recent sales slump triggered an unexpected plunge in the firm's first-quarter earnings.

……

Big red?

As part of a major educational research support program to benefit Central Eastern European countries, **IBM Europe** will team up with **Hungarian, Czech and Slovak, Polish** and **Yugoslav** universities to set up computer reference and development centers in their respective countries, the company announced recently. Within limits allowed under Coordinating Committee on Multilateral Export Control regulations, IBM will supply the necessary hardware, systems software and applications programs to the centers, four of which are expected to be operating by the end of this year. Training will be available from IBM as well.



Lotus nurtures child-care program

BY SALLY CUSACK
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. has joined the fledgling ranks of high-tech companies committed to providing on-site child-care facilities for children of employees.

The child-care center officially opened last week at the software company's headquarters and currently has 26 children enrolled, according to Bryan Simmons, a spokesman for Lotus. The center will be filled to the maximum 72-child capacity within the next few months, Simmons said.

"We've already had to turn a number of parents away," he said.

The center will accommodate children from three months to five years of age and will operate under a sliding fee scale. A "get-well" room for children recovering from mild illnesses will also be available. The already prized placements are determined by lottery.

Programs aplenty

Lotus offers several programs for working parents. A dependent-care tuition program, for instance, allows employees to realize tax savings on care expenses for both children and elderly dependents. A child-care tuition assistance program is available for employees with a family income that falls below a certain level. The company also provides job-sharing options and access to a child-care resource and referral center.

Further news for those in the computer industry who are among the growing number concerned about child care came from Atlanta, where it was announced last week that AT&T's Family Care Development Fund will furnish a $31,000 grant to the Child Care Solutions organization to provide training and resources to family child-care providers in DeKalb and Gwinnett counties in Georgia. Child Care Solutions is a resource and referral agency that is affiliated with the Save the Children foundation.

AT&T's funding program is a $10 million, three-year, national grant-making initiative in conjunction with the Communications Workers of America and the International Brotherhood of Electrical Workers.

So far, this year's grants are supporting seven projects in six states, at a reported total of $200,000. Projects being funded include child-care center expansions, after-school programs and quality improvement efforts to support residential child care.

NATIONAL BRIEFS

Driving a stake

Digital Equipment Corp. made one of its relatively rare appearances as an equity investor last week, buying a minority interest in Campbell, Calif.-based fast-packet networking systems maker **Stratacom, Inc.** Two years into a so-far successful marketing and development alliance with Stratacom, DEC is now taking a stake in its ally in the expectation that DEC will garner global distribution rights to Stratacom's IPX fast-packet networking system, while Stratacom becomes the preferred T1 supplier for its new investor's internal communications network.

……

Looking for Mr. Wright

Former **McCormack & Dodge** head of worldwide field operations Stephen Wright, one of the business software company's bigger players lost in the wake of its transition into the new **Dun & Bradstreet Software**, surfaced last week at computer-aided software engineering products maker **Index Technology Corp.** At Index Technology, Wright will reportedly occupy the newly created office of senior vice-president of field operations, with responsibility for worldwide sales, support and consulting.

……

Here's to your health

Communications giant **Bell Atlantic Corp.** last week agreed to buy the stock of Greenbrae, Calif.-based hospital information management systems provider **Simborg Systems Corp.** Terms of the deal, which is expected to close within the next 60 days and will wed Simborg's Stat Lan hospital systems integration development software to Bell Atlantic's complementary network and business systems products, were not disclosed. Founder Donald Simborg will remain as president of his 6-year-old firm in its new incarnation as Bell Atlantic Healthcare Systems, according to the firms.

It's the best part. Which means any laser printer that doesn't contain PostScript software from Adobe Systems is missing a very special ingredient. Fortunately, every major printer manufacturer now offers a full line of PostScript printers. So call Adobe® at 1-800-952-6300, Dept. 125, for the complete list. Then you'll really have something to chew on.

POSTSCRIPT®
From Adobe Systems
The Best Part Of A Laser Printer.™

"The Best Part Of A Laser Printer" is a trademark of Adobe Systems Incorporated. Adobe, PostScript and the PostScript logo are trademarks of Adobe Systems Incorporated, registered in the U.S.A.
© 1990 Adobe Systems Incorporated. All rights reserved

You're looking at your largest technology investment. What a shame you've had to expend most of it working around the limitations of conventional databases.

Fortunately, Ingres has changed all that by introducing the first intelligent database.

We call it intelligent because it helps organizations operate more intelligently. In short, it gives you the ability to manage not just data, but knowledge and objects as well.

The unique Ingres Knowledge Management™ facility lets you manage business policies or

1080 Marina Village Pkwy., Alameda CA 94501 (Corp. Headquarters) • 1801 Rockville Pike, Suite 200, Rockville MD 20852 • 5650 Yonge St., Suite 1700, North York, Ontario M2M 4G3. Ingres, Intelligent Database,

Finally. A database
to free-up all this v

rules—and referential integrities—inside the database server. Because this information is centrally enforced and managed, you get complete control of your data and its integrity. And your programmers don't have to write rules and referential integrities in each application.

ge Management and Object Management are trademarks of Ingres Corporation. © 1990 Ingres Corporation.

An unlimited number of rules can be stored in the server. And features like unlimited forward chaining and recursion mean that rules fire when expected.

Ingres Object Management™ gives you the ability to manage types of data that are difficult or impossible for conventional databases. User-defined datatypes—like geographic coordinates or manufacturing tolerances—are stored and used within the database server. They can even be manipulated using standard SQL.

Rather than wasting time converting data to fit the constraints of your database, you can teach your database to understand data the way your organization uses it. So your data becomes more relevant to how you do business, and your database more useful than ever.

And as if this weren't enough, the Intelligent Database™ also features improved data management capabilities, giving you enhanced performance for OLTP, decision support and distributed processing.

The net result: the Ingres Intelligent Database lets you model the real world—your business—like no other database in existence.

So remember. When you want to get the most out of your most valuable hardware, you have only one intelligent choice.

Call 1-800-4-INGRES to find out more.

Ingres

Intelligent database. Intelligent decision.

intelligent enough
luable hardware.

Ask knocks on standards door

Ask CEO Kurtzig aims the firm's future in the direction of open systems

BY J. A. SAVAGE
CW STAFF

MOUNTAIN VIEW, Calif. — The ponderous change to open systems that has taken its toll on a long list of computer firms in the Silicon Valley never quite struck Ask Computer Systems, Inc.'s bottom line. On the other hand, while it was not losing any ground in sticking to proprietary systems during the last few years, the company was rolling along with nowhere to grow.

Now, with its founding chief executive officer back at the helm after a two-year hiatus, the company is taking a new tack by focusing on open systems software with a decreased emphasis on hardware business.

Ask has produced manufacturing software primarily for Hewlett-Packard Co. minicomputers for nearly two decades. Recently, it added Digital Equipment Corp. VAX workstations and IBM's Application System/400 to its hardware platform catalog.

That will not be enough for the 1990s, according to CEO Sandra Kurtzig, so Ask is developing and expanding its software to run on the Unix operating system.

"The fact that we waited so long, so well, is a tribute to having good products," she said. "Ninety percent of our customers don't want to install [open systems] today — manufacturing companies tend to be conservative — but if you wait until they start asking for it, it's too late."

Ask CEO Kurtzig: *'Too young to retire forever'*

With approximately 33% of Ask's research and development budget being funneled into products for open systems, "we think of ourselves as a start-up," said Peter West, vice-president of business development.

Development lies primarily in taking apart the software code to make it portable over different platforms, West said. Currently, there are different versions of the software for each platform.

Ask plans on having open systems products by the end of the year, according to West. They will be tuned for both HP's proprietary operating system and its version of Unix, he said. DEC-based products will also have proprietary and open systems versions, he added.

In addition, West said, Ask plans to port its open software to Sun Microsystems, Inc. workstations but has not yet forged a reseller relationship with Sun.

By focusing on open systems, "we expect hardware to decrease as a percentage of our business," West said.

Ask, which has been the largest value-added reseller of HP products, originally undertook its sales of hardware "because companies wanted a turnkey system," Kurtzig said. "As they want to mix and match hardware, our job will be less focused on selling it."

Trading sand for silicon

Sandra Kurtzig had what most people only dream about — an early retirement with cushy benefits — and that's not even counting the designer house on the beach in Hawaii.

But Kurtzig gave up sand for silicon.

After two years away from the company she founded, Ask Computer Systems in California's Silicon Valley, Kurtzig returned last October to steer the firm in a new direction.

Her successor and predecessor in the chief executive officer's post, Ronald Braniff, had maintained the company's earnings, Kurtzig said, but the board of directors became impatient with the company's failure to stake out new territory.

"Our customer base could see things changing [toward open standards]. They wanted us to lead them," she said .

Kurtzig said that despite the idyllic seclusion of her two-year break, she returned to her company willingly, taking the advice of one of her sons: "Mom, you're too young to retire forever."

J. A. SAVAGE

Samsung strives for Top 10 status in European market

BY RALPH BANCROFT
IDG NEWS SERVICE

FRANKFURT — Samsung Electronics is leading the charge of South Korean computer manufacturers into Europe with the goal of eventually reaching a position in the top 10 by the year 2000.

The 15th largest company in the world outside the U.S., Samsung is already established in a number of European markets and intends to build on that success through the establishment of Samsung Information Systems Europe, which recently set up shop in West Germany.

"We have had a certain amount of success so far with semiconductors, and we are the world's largest manufacturer of monitors," said H. W. Lee, Samsung's chief executive officer. "We have to do the same thing on the computer systems side."

Initially, the Frankfurt office will act as a European headquarters, coordinating product planning, logistics and advertising. In the longer term, the company plans to set up a European manufacturing plant to service local markets.

"In order to get to a top 10 position, you need to have local manufacturing, and that must happen very soon," Lee said.

The company has already established personal computer operations in the UK and France and plans to expand to other markets before 1992 and the advent of the single European market.

The key to Samsung's success in the UK has been the emphasis placed on domestic decision-making by local people, Lee said. "We will accelerate this Europeanization," he added.

Worldwide, Samsung reported sales of $8 billion in 1989 and currently has 180,000 employees.

Versant is dreaming big

Firm hopes its DBMSs will stand out in crowd

BY JEAN S. BOZMAN
CW STAFF

MENLO PARK, Calif. — In an attempt to break away from the object-oriented technology firm pack, Object Sciences Corp. recently renamed itself Versant Corp. and announced that its object-oriented database management systems and application development tools were being shipped to 20 commercial customers around the world.

Seashols breaks *Versant away from object-oriented pack*

"Our vision and our passion is to become a large software company," said Chief Executive Officer P. Michael Seashols, a veteran executive of relational DBMS players Oracle Systems Corp. and Ingres Corp. "We think the market will be large and that all the major relational DBMS vendors will have to reposition their products to have object-oriented storage and retrieval."

In the last 18 months, Seashols has raised $8 million in venture capital and private funding to get his firm off the ground. His strategy: Market to systems vendors reluctant to spend research dollars on object-oriented technology. Versant has 38 employees and a goal of doubling that number by March 1991.

Still, Versant's moves are not likely to redefine the fledgling object-oriented market, said industry analyst Les Hellenack at Framingham, Mass.-based market research firm International Data Corp.

"It's very difficult to tell the competitors apart, because they keep leapfrogging each other in terms of technology," Hellenack said. He estimated that there are currently a dozen leading object-oriented firms, including Ontologic, Inc. and Symbolics, Inc. in Burlington, Mass.; Servio Logic Corp. in Alameda, Calif.; and Objectivity, Inc. in Menlo Park, Calif.

Versant said its $15,000 DBMS and Versant View development tool, which allows users to browse through objects and classes of addresses, caters to the special requirements of computer-aided design/manufacturing and computer-aided software engineering applications. Users can define objects that are quite varied, including three-dimensional shapes, two-dimensional drawings and completed banking transactions.

COURT
REPORT

David Flaherty

When San Jose, Calif.-based **Kimtron Corp.** debuted its Sherwood division's new terminals at Comdex/Spring '90, it no doubt believed it was doing something smart. The problem is, a competitor said that Kimtron was doing something Wyse. Wyse Technology, Inc. subsidiary **Link Technologies** slapped Kimtron with a lawsuit alleging that the new Sherwood line was developed with proprietary information misappropriated by former Link employees. In addition to damages for the alleged theft, Link is seeking to enjoin all sales of the allegedly tainted terminals.

Last fall, computer service firm **Hypoint Technology, Inc.** felt that **Hewlett-Packard Co.** was muscling it out of business by ceasing to provide certain favorable terms to Hypoint customers, so the tiny Cleveland-based company decided to make a federal case out of it. A federal district court recently weighed in on David's side, awarding Hypoint treble damages of $1.5 million under the Sherman Antitrust Act.

Summer vacation moved a step closer to reality for a Santa Clara, Calif., superior court judge late last month as **Chips and Technologies, Inc.** and **Elite Microelectronics, Inc.** settled their differences short of a trial. Chips and Technologies had kicked off 1990 by suing Elite, charging trade secret violations. In the final hours of May, however, the embattled parties arrived at a resolution: A jointly-appointed independent inspector will drop in on Elite from time to time to make sure that none of its products are being developed using ill-gotten Chips and Technologies' technologies.

The information business

Fast growth and central role of IS shape outlook at data suppliers

BY ALICE BREDIN
SPECIAL TO CW

The information industry is alive and well. The woes of Wall Street have prompted some problems for suppliers of financial data, but most companies dealing in electronic information, including news and of market research, are growing rapidly.

Last year, the number of subscribers to the 50 leading providers of on-line information services grew by 18%, according to Chris Elwell, editor of "Information Industry Bulletin," a newsletter published by Digital Information Group in Stamford, Conn. The providers' revenue grew about 17%, from $4.4 billion in 1987 to $5.2 billion in 1988, the last year for which figures were available, Elwell says.

Information systems executives in the information industry, even more than in fields such as banking and insurance, play an integral role in the development of their firms' services. "We don't develop traditional packages such as inventory management," says Louis Santoro, vice-president of IS and services at The Arbitron Co., a Laurel, Md.-based subsidiary of Control Data Corp. "We are designing the products our customers buy."

Nevertheless, the compensation offered top IS executives in the information industry is comparable to the levels for other industries, according to Barbara Gibbs, a senior consultant at Edward Perlin Associates, Inc., a New York compensation consulting company. Perlin puts the average base compensation for top IS executives with staffs of 200 or more at $198,000 per year.

The rapid growth of the information industry is shaping requirements for top IS jobs. The biggest challenge is developing systems quickly, Santoro says; the alternative is losing out to competitors. "There is a window of opportunity that will be lost if we cannot present a solution in time," he says.

Right now, the window is open to develop services for the European market. Internal trade barriers are falling, and the radio and television stations Arbitron produces audience ratings for are being sold by governments. "Once a company gets a foothold, that opportunity won't be there," Santoro says.

As a company grows quickly, IS executives must expand capabilities without letting technology get out of control. The difficulty can be compounded when a company disseminates information through publications, microfiche and other media; the diversity of product lines encourages a proliferation of disparate hardware and software.

Andy Ross, manager of applications programming at Congressional Information Services in Bethesda, Md., says one of his biggest challenges is limiting the number of database applications, even though the company's services call for some variety in the systems it employs.

The career paths that lead to the offices of information industry IS executives are changing. Increasingly, companies are looking for people from nontechnical fields and — in many cases — from other companies.

Prior to serving as president of the data systems division at Information Resources, Inc. in Chicago, Ned Heinbach was chief operating officer at GE Professional Services Co., with responsibility for its profit or loss.

In "the old days" — through the early 1980s — top IS executives at information vendors tended to come up through the ranks, Heinbach says. More and more, however, companies are looking for people who have worked outside IS. Experience in sales, setting strategy, taking risks and holding responsibility for results are key ingredients, Heinbach says.

THE CAREER PATHS that lead to the offices of information industry IS executives are changing. Increasingly, companies are looking for people from nontechnical fields and — in many cases — from other companies.

IS executives in the information industry often need to understand the needs of customers in a variety of businesses. Retailers, for example, buy information collected from point-of-sale (POS) systems at other companies to assist them in planning their purchases.

IS managers helping their companies supply retailers with the data need to know how their systems can grab it from various POS systems and deliver it to customers, says Jim Keough, manager of network engineering for GE Information Services in Rockville, Md.

The demand for business acumen doesn't mean information industry IS executives can get by with only a high-level understanding of the technology their services rely on. Often the customers are technologically savvy corporate IS managers who are less and less willing to accept traditional approaches.

"IS directors have to take a broader view of technology. That means truly incorporating PCs, workstations, LANs and minis," says William Dunn, senior executive at Dow Jones and Co. and former head of its information services division. "The managers that will survive will realize that customers are less sanguine about accepting mainframe solutions."

The range of technologies some companies deploy calls for expertise at tying them together. It also means that there is a minimal number of staff people who understand individual systems. With the turnover of programmers and analysts, it is important for IS directors to know the technologies well so they can into the breach.

"We run applications that are limited to a few companies and that very few people know about," Ross says. "It is important [for me] to have a solid technical understanding so I can train people and so I can fill in."

Bredin is a free-lance writer based in New York.

CA & AZ CONTRACTS

CONSULTANTS WANTED

P. Murphy & Associates, Inc.

4405 RIVERSIDE DRIVE, SUITE 100
BURBANK, CA 91505
(818) 841-2002 (714) 552-0506
FAX: (818) 841-2122

SYSTEMS ENGINEER: Job Order No: 453233; Overall supervision of company's extensive computing environment. In charge of configuring and maintaining computer hardware, software and electronic systems for networking computers, CNC (Computer Numerical Control) machines, etc. Electronic Data Processing, design and development of directional drilling model simulation (interactive and graphics), software packages on computers and plotters. Development of management information system needing creation of company data-base. Buying and configuring CAD (Computer Aided Design) and Multi-axis CAM (Computer Aided Manufacturing) systems; $36,500/Yr. 40 hrs./week; B.S. in Engineering. CONTACT: La. Office of Employment Security 706 East Vermilion St. Lafayette, La. 70502.

CONTRACT PROGRAMMERS
WITH A MINIMUM OF 4 YRS EXP.

DB ADMINISTRATOR
Up to $45 per hour

ADABAS/NATURAL 2.0
SENIOR PROGRAMMER/ANALYST
Up to $40 per hour

IDMS/ADS/O
CICS/OS/DOS
PRIME 9000
DEC, MICROVAX
VMS, DECNET
INGRES/ORACLE
FOCUS
P/C SPECIALIST
IMS/DB/DC
AS400, S38, MICS
UNISYS, UNIX
DB2, SQL
ETHERNET
UNIVAC 1100, TIP
ADA
MODEL 204

Openings in CA, TX, LA, MO, OK, IL, OH, MI, NC, VA, and West VA.

J.P.S. INC
P.O. Box 690007
Houston, TX 77269-0007
(713) 820-0024
Toll Free (800) 633-0391
FAX (713) 370-8021

No trainees or part-time positions
Equal Opportunity Employer

RSVP SERVICES

ANALYSTS • PROGRAMMERS • HW/SW

In a Slow Market, You Need A Quick Employment Service

If you have marketable skills, together with reasonable geographic and salary requirements, your resume will be on its way selectively, to our applicable contacts among our 1000+ client companies and 200+ affiliates nationwide, ***within 24 hours after we receive it.*** No cost or obligation to you, no sales pressure

Our clients seek 2 years minimum professional experience, stable work history, good technical references, and U.S citizenship or green card

TO APPLY: Mail or FAX resume or call Howard Levin.

RSVP SERVICES
Dept. C, Suite 614, One Cherry Hill Mall, Cherry Hill, NJ 08002
800-222-0153 or FAX: 609-667-2606 (refer to Dept. C)

Senior Consultants and Programmers

CW Systems Inc. is a leading consulting firm specializing in custom software development projects using the latest software engineering techniques in challenging environments. If you have **proven skills** in one of the following areas, please call and/or send your resume to the addresses below:

- CASE
- ORACLE
- MODEL 204
- POWERHOUSE
- AIX, OS2
- FOCUS
- CREDIT CARD
- TRANSFORM IMS
- ADABAS/NATURAL
- SECURITY ADMINISTRATOR

CW Systems Inc.

600 Congress Avenue
Ste. 2780, Dept. CW6/25
Austin, Texas 78701
(512) 469-0245

14643 Dallas Parkway
Ste. 525, Dept. CW6/25
Dallas, Texas 75240
(214) 980-0071

2925 Briarpark
Ste. 830, Dept. CW6/25
Houston, Texas 77042
(713) 781-7466

Westinghouse Idaho Nuclear Company, Inc.

HP 3000 Programmer Analyst

We are seeking a candidate with a BS Degree in Information Systems, Computer Science, or equivalent degree and five to seven years HP3000 experience using COBOL, IMAGE, and VIEW. Some IBM mainframe and microcomputer working experience is desirable. Additionally, the candidate must have a strong working knowledge of structured development methodologies and possess proven interpersonal, analytical, and design/development skills.

The successful candidate will be responsible for analysis, design, programming and documentation for new and existing business applications.

All applicants must have, or qualify for, a DOE "L" security clearance.

For immediate consideration please send resume with copy of advertisement to: Ace Ballard

Westinghouse Idaho
Nuclear Company, Inc.
P.O. Box 4000, Code CW
Idaho Falls, Idaho 83403

Equal Opportunity Employer
U.S. Citizenship Required.

Here at Paxus, when we send you off on a short or long-term assignment in Australia, we like to keep track of how you're coping with the sun, sand, surf and other "hazards" of contracting "Down Under". We like to keep up to date on how you're using your skills as an

Analyst Programmer with MVS, PL-1, IMS DB/DC, DB2
Analyst Programmer with CASE tools experience
Analyst Programmer with motor vehicle industry experience
Systems Programmer with MVS/XA or MVS/ESA.

But, as you can imagine, the flexibility and freedom of consulting allows you time off to get off the beaten track and discover Australia.

And occasionally, after they have completed their term, we do lose track of some consultants.

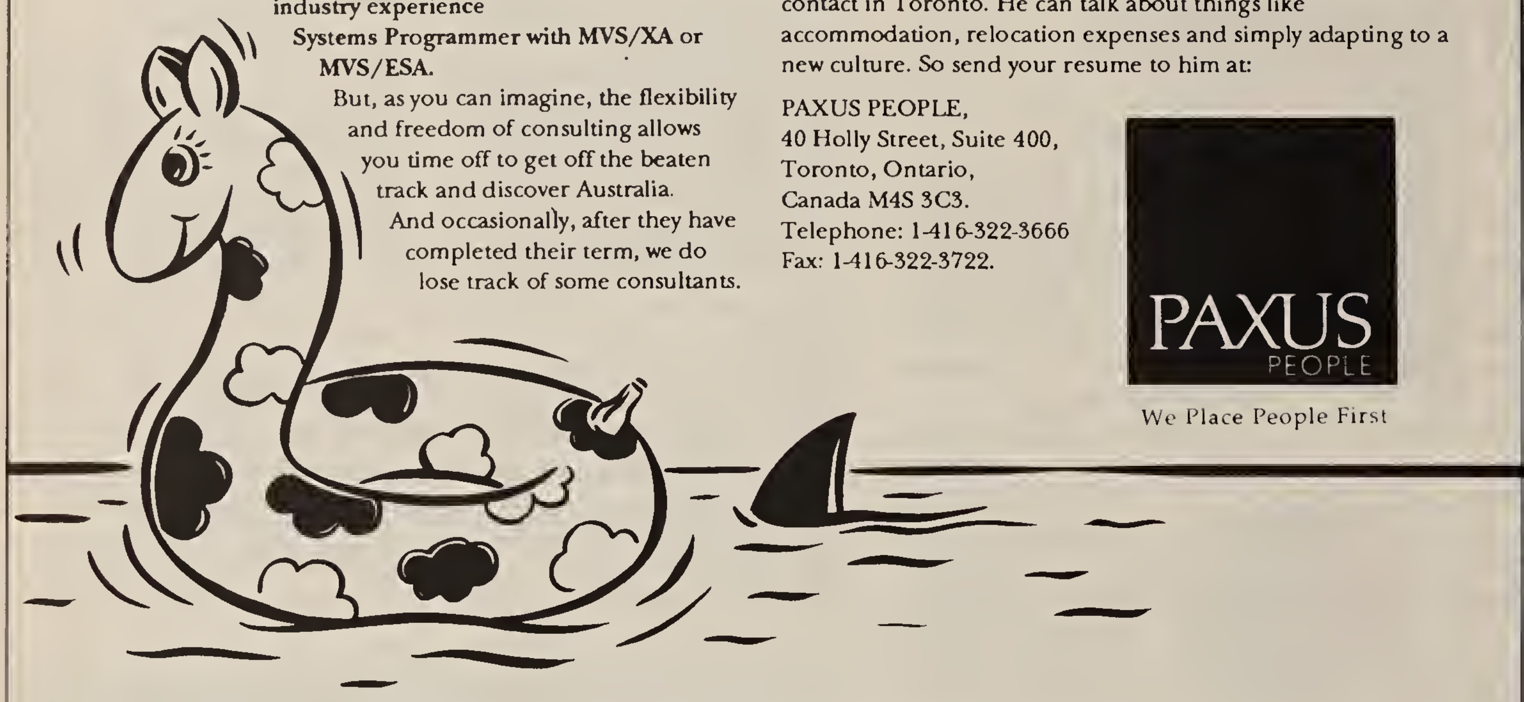
Last year, for example, David Scott went trekking off to the Olgas. Susan Bourcier disappeared off the face of the earth, only to turn up months later on a Barrier Reef Island. Margery MacIntosh on the other hand, went missing in action on a wine tasting tour of the Barossa Valley.

So, if you're a permanent employee or consultant with a minimum of four years' experience and quite like the idea of losing yourself Down Under, you could share your experiences with David, Susan and Margery. Kevin Charman is the person to contact in Toronto. He can talk about things like accommodation, relocation expenses and simply adapting to a new culture. So send your resume to him at:

PAXUS PEOPLE,
40 Holly Street, Suite 400,
Toronto, Ontario,
Canada M4S 3C3.
Telephone: 1-416-322-3666
Fax: 1-416-322-3722.

PAXUS
PEOPLE

We Place People First



Last year in Australia we only lost three Consultants.

PROJECT LEADER:
Project Leader for retail merchant chain in Lorain, Ohio. Lead team of 1 to 8 analysts, senior analysts, programmers to design, write and install original software for on-line/database systems to support corporate divisional credit systems. Interface with senior corporate and computer management to evaluate present MIS systems and participate in long-range systems development planning. Initiate projects, assemble staff, define project parameters; develop allocation requirements, scheduling, standards. Coordinate projects and provide high level technical assistance to divisional units. Utilize IBM 3083 & 4341, TANDEM, MVS, DOS, VSAM, CICS, COBOL, ASSEMBLER, PANVALET. Req 2 yrs of college with science major + 2 yrs exp in the job described or 3 yrs exp in senior analysis which must have included one yr exp with hardware: IBM, Tandem, PC utilization; software: DOS, MVS, VSAM, COBOL, Assembler, + mainframe systems implementation & maintenance for Retail/Credit business. 35 hrs/wk; 9:00AM to 5:00PM, Mon to Fri; $55K/yr. Must have proof of legal authority to work permanently in U.S. Send resume in dupl (no calls) to J. Davies, JO#1084567, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

INDEPENDENT CONTRACTORS

ALL SKILLS
ALL LOCATIONS

Maximize your exposure and your billing rate. We mail your resume to brokers nationwide at no cost to you.

For more information call:

(704) 342-9519

Or mail your resume to:

JKL Enterprises, Inc.
500 North College
Suite 108
Charlotte, NC 28202

SENIOR ACP/TPF SYSTEMS ENGINEER required. TPF design and analysis of software systems and operating systems using ACP/TPF, Assembler programming/coding and CMS Test Tool development language. Will analyze, develop, implement and support software in the real time control programs internals area. Control program internals, include the software that controls the hardware, schedules resources and provides facilities to applications and system programmers working on the real time system. Will work on project to migrate real time system from ACP/TPF to IBM TPF3.1 by researching impact of new TPF3.1 system architecture on existing hardware/software and developing new facilities to allow programming staff to fully exploit the increased capacity of the new architecture. Applicants required to have bachelors degree in math, computers or engineering with at least four years ACP/TPF Internals and Assembler coding experience. Education and experience will be found acceptable if applicant has a combination of professional development courses, training and experience equivalent to a Bachelors of Science in Computers plus four years experience ACP/TPF Internals and Assembler coding. Annual Salary will be $43,000 per year for a 40-hour work week. Additional salary up to $48,000 per year may be paid if education and experience warrant. Interested applicants apply at the Texas Employment Commission, Dallas, TX, or send resume to the Texas Employment Commission, Austin, TX 78778-0001, J.O. number 5424624. This advertisement was paid by an equal opportunity employer.

LIMITLESS GROWTH POTENTIAL. ABUNDANT OPPORTUNITIES.

That's Computer Task Group. If you're an innovative, quality-driven computer professional who thrives on the challenges of project diversity, CTG is where you should make your mark. We've consistently been rated among the best in the areas that define job satisfaction: use of ability, work activity, creativity, independence, and responsibility. Every day our experts turn information technology into business solutions for more than 85 of the Fortune 100. And, with over 60 locations worldwide, we are where you want to be.

As an international leader in consulting, systems integration and professional services, CTG's successes have made us a multi-million dollar company. But we won't stop here. As part of our aggressive expansion effort, we're staffing up our impressive work force - 3800 strong - to meet the needs of the changing information management industry.

Right now, we're seeking more peak performers to tackle new technologies. We're looking for the best in the business with expertise in:

- DB2
- UNIX C
- AS/400
- ORACLE
- IEF, IEW
- CICS
- OS/2, C
- IMS DB/DC
- Imaging

Limitless Growth Potential. Abundant Opportunities. You expect it. We provide it. For immediate consideration, send your resume to:

Communications Department
Computer Task Group
800 Delaware Avenue
Buffalo, NY 14209
Or call 1-800-535-9600

Equal Opportunity Employer

CTG

Innovation & Quality
The I.Q. Company

DST TOUCHES MANY LIVES

IN MANY WAYS...

If you've ever owned a mutual fund, had a prescription filled or been covered by life insurance, you probably already know us.

DST's people are an important part of the nation's financial markets. We are a leader in an industry we helped to change and shape through the introduction of on-line technology. And through our affiliates, Policyholder Service Corporation and Argus Health Systems, we are a leader in both the non-traditional life insurance market and the prescription/healthcare industry.

DST's business IS data processing!

Applications Programmer

DST employs more than 2,500 people including over 700 data processing professionals. By setting our sights on the future, (AS400's, Imaging, 'C') our commitment to state-of-the-art requires us to search out the most advanced tools and maintain a superior training facility.

To adequately support our applications, DST built and operates one of the largest commercial-based data centers in the Midwest, a disaster-proof facility utilizing mainframes capable of processing over 325 MIPS.

If you'd rather be a participant than an observer and are experienced in a variety of data processing skills, call us now toll-free at 1-800-874-0174. Or mail in the mini-resume below to: **Dawn Ludwick, Corporate Technical Recruiter, DST Systems, Inc., 1004 Baltimore, 9th Floor, Kansas City, MO 64105.** An Equal Opportunity Employer.

DST DST SYSTEMS INC.

Name ______
Address ______
City ______ State ______ Zip ______
Current Employer ______
Title ______
Total years experience ______ Degree in ______
Experience in:

☐ COBOL or Assembler in an OS/MVS environment
☐ McCormack and Dodge
☐ AS400
☐ CASE tools
☐ Artificial Intelligence
☐ PC
☐ VSAM
☐ C
☐ CICS
☐ Information Engineering
☐ DB2

PROGRAMMER ANALYST

Challenging software development position in a growing progressive company

Minimum two years COBOL in IBM DOS-VSE environment

ADABAS, NATURAL experience helpful

Excellent benefits

Please send resume to **Personnel Director:**

FLYING J, INC.
P.O. Box 878
Brigham City, Utah 84302
Equal Opportunity Employer

Systems Analyst

M.S. in Computer Science. Will be involved with analyzing business procedures to convert data to programmable form using BISYNC, ASYNC and COPS Protocols to set up communication links between POS terminals and host processors. Will develop tools for scrip terminals for retail application. Will use concepts and theories of computer architecture and microprocessing, PMS hardware and C Tree software. Must have one year experience as a Systems Analyst. 5 day 37.5 hr/wk $35,000/yr. Apply with resume and references to: **BMT, 339 East Ave., Suite 315, Rochester, NY 14604.**

TANDEM

BOSTON
30K - 65K

Serving the Needs of the TANDEM Computer Professional.

Charles Bystock
617-762-4747
WINDSOR GROUP
57 Providence Highway
Norwood, MA 02062

THIS SPACE FOR HIRE

Call Today to place your recruitment ad.

800-343-6474
in MA, 508/879-0700

THANKS MARGIE-PROMISE-THIS IS THE LAST TIME I'LL BORROW YOUR COMPUTERWORLD.

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1 **BUSINESS/INDUSTRY** (Circle one)

10. Manufacturer (other than computer)
20. Finance/Insurance/Real Estate
30. Medicine/Law/Education
40. Wholesale/Retail/Trade
50. Business Service (except DP)
60. Government - State/Federal/Local
65. Communications Systems/Public Utilities/Transportation
70. Mining/Construction/Petroleum/Refining/Agric.
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90. Computer/Peripheral Dealer/Distr./Retailer
75. User: Other ____________________
95. Vendor: Other ____________________
(Please specify)

2 **TITLE/FUNCTION** (Circle one)

IS/MIS/DP MANAGEMENT
19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
21. Dir./Mgr. MIS Services, Information Center
22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Suprv. of Programming, Software Dev.
32. Programmers, Software Developers
60. Sys. Integrators/VARs/Consulting Mgt.
OTHER COMPANY MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
51. Sales & Mktg. Management
OTHER PROFESSIONALS
70. Medical, Legal, Accounting Mgt.
80. Educator, Journalists, Librarians, Students
90. Others ____________________
(Please specify)

3 **COMPUTER INVOLVEMENT** (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant.

A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Local Area Networks
F. No Computer Involvement

E4026-9

THANKS MARGIE-PROMISE-THIS IS THE LAST TIME I'LL BORROW YOUR COMPUTERWORLD.

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)

10. Manufacturer (other than computer)
20. Finance/Insurance/Real Estate
30. Medicine/Law/Education
40. Wholesale/Retail/Trade
50. Business Service (except DP)
60. Government - State/Federal/Local
65. Communications Systems/Public Utilities/Transportation
70. Mining/Construction/Petroleum/Refining/Agric.
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90. Computer/Peripheral Dealer/Distr./Retailer
75. User: Other ____________________
95. Vendor: Other ____________________
(Please specify)

2. **TITLE/FUNCTION** (Circle one)

IS/MIS/DP MANAGEMENT
19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
21. Dir./Mgr. MIS Services, Information Center
22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Suprv. of Programming, Software Dev.
32. Programmers, Software Developers
60. Sys. Integrators/VARs/Consulting Mgt.
OTHER COMPANY MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
51. Sales & Mktg. Management
OTHER PROFESSIONALS
70. Medical, Legal, Accounting Mgt.
80. Educator, Journalists, Librarians, Students
90. Others ____________________
(Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant.

A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Local Area Networks
F. No Computer Involvement

E4026-9

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

Put your career on the map

In Phoenix, Arizona!

Enjoy the best of both professional and personal worlds with CIBER in exciting Phoenix, Arizona. We are a progressive, growth-oriented consulting firm with excellent career opportunities for motivated individuals with a minimum of three years data processing experience in an IBM Mainframe environment. Immediate openings exist in the following areas:

COBOL	***PL/I***
IMS DB/DC	***IEF CASE***
DB2	***TRANSFORM***
DL1, CICS	***TELON***
CPCS	***HOGAN***

We'll reward your expertise with a competitive salary and benefits package including relocation assistance. Arizona is a land rich in history with year-round sunshine and a variety of cultural and recreational activities. Put your career on the map by forwarding your resume with salary history to:

CIBER

An Ethic of Excellence

CIBER, Inc.
Dept. CW6O
3003 N. Central Ave.
Suite 2512
Phoenix, AZ 85012
Call (602) 234-0411
Fax (602) 265-7185

An Equal Opportunity Employer M / F

PROGRAMMER/ANALYST
UNISYS EXPERIENCE
ATLANTA, GA

MTB Computer Consulting Corp. a recognized leader in UNISYS third-party consulting support has an urgent need for several software professionals to work on a document processing imaging project.

We require the following:

a minimum of three years experience with UNISYS "V" or "A" series mainframes using COBOL

-- OR --

a minimum of one year experience with UNISYS S3000/S4000 systems.

MTB offers a very competitive salary plus company paid insurance, an incentive bonus plan, an education plan and relocation assistance. We also provide legal assistance with regard to visas and alien status for qualified individuals. In addition we are receptive to non-employee relationships. For immediate consideration please call or send your resume in strictest confidence to:

MTB COMPUTER CONSULTING CORP.
139 FULTON STREET SUITE 314
NEW YORK, NY 10038
PHONE: (212) 406-4805 FAX: (212) 406-4853

CONSULTING OPPORTUNITIES to $60,000

DB2 TRAINING AVAILABLE

We have leading edge technology assignments, aggressive salary and benefits program, and a low cost of living area.

We seek Professionals (two years minimum experience please) with any of the following skills:

- IMS-DB/DC DB2
- DATACOM-IDEAL
- ADABAS-NATURAL
- IDMS-ADS/O
- C-UNIX
- VAX-INGRES
- MANTIS-SUPRA
- ORACLE-CICS-
- COBOL PL/1

B-1 VISA opportunities available.

TECHNOLOGY CONSULTING, INC
2020 Meidinger Tower, Louisville, KY 40202
Call (502) 589-3110 FAX (502) 589-3107

Switching Systems Engineer, 40 hrs/wk. 8:00 a.m. to 5:00 p.m., $43,600/year. Development of cost-efficient switching systems for upcoming generics in the 5ESS switch. Software design and maintenance for interface between customers and database for varying hardware configurations. Tools: UNIX, C. Global Database Manager, View Definition language, Relational Definition language. Master of Science in Computer Science as well as six months experience as a Switching Systems Engineer or as a Computer Lab Assistant. Previous experience must include systems programming with UNIX/C and relational database design. B.S. in Electrical Engineering, Graduate course work must include: Data base design; Object-oriented programming concepts; Computer system communications. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 S. State Street - 3 South, Chicago, Illinois 60605, ATTN: Joan Sykstus, Ref. #1409-S, AN EMPLOYER PAID AD.

TO LEARN!
TO SERVE!
TO SUCCEED!

Are these the things you want? Read on!

Since 1976 we have been a leading consulting firm in the development of mainframe applications using state-of-the-art technology. Our **CALIFORNIA REGION** currently has a need for professionals with a min. of three years experience and one or more of the following skills:

- DB2/CSP
- DB2/SQL/QMF
- M204
- COBOL/VSAM/CICS
- PAYROLL/IDMS/ADSO
- TESSERACT BPA
- COBOL/VSAM/MVS/JCL

Benefits include tuition reimbursement & profit sharing, competitive compensation & a variety of project assignments. Send resume to:

DATRONICS
14241 Firestone Blvd. Suite 220
La Mirada, CA 90638
Call: 213/802-3262

BUSINESS SYSTEMS ANALYSTS

Innovating Beyond The Edge.

©McRAY MAGLEBY, PROVO, UTAH

Leaving Tradition Behind.

The next wave in innovative information systems and strategies is being formed today at Kraft General Foods. As a $23 billion, Fortune 50 corporation with operations in 140 countries, Kraft General Foods is the largest U.S. based international food company. Our Information Systems Group is reshaping and reengineering the way our business operates and competes. It's a strategy that is transforming traditional business practices and computing environments into a competitive weapon that will change an industry and assure our worldwide leadership.

This environment isn't for everyone. We will expect you to be something of a visionary, and capable of providing business solutions, not just technical options. We're determined to hire only the best — creative thinkers who can look at the big picture, not just the small screen. Join us at the crest of potentially explosive growth. We have current opportunities in our state-of-the-art IBM environment for:

ORDER MANAGEMENT
LOGISTICS
DECISION SUPPORT
CASE TOOLS
DATABASE ADMINISTRATION
SYSTEMS SOFTWARE
HUMAN RESOURCE INFORMATION SYSTEMS/PAYROLL
TELECOMMUNICATIONS

To join our team, you need a B.S. degree in business, finance, business information systems or computer sciences. An MBA is preferred. In addition, you must have at least 2–5 years' experience in information systems/business analysis.

To attract top talent we offer generous salaries, complete benefits, and a business and systems environment that could lead you beyond traditional technical ladders and into general management. Join us and make business history, and a name for yourself. To confidentially explore these opportunities, send your resume with salary history to: Christina Kucharyszyn, Kraft General Foods, Kraft Court, 4N, Glenview, IL 60025. We are an equal opportunity/affirmative action employer.

KRAFT GENERAL FOODS

INNOVATING BEYOND THE EDGE. LEAVING TRADITION BEHIND.

ATLANTA (404) 447-8773
Southeast TO $95,000

TOP RATES NOW IN 7 STATES
Contract or Permanent Employment

COBOL • VSAM • CICS • DATACOM • DB2
IDMS/ADSO • AS400 RPG III • 36 RPG II
DEC • DIBOL • COBOL • UNIX • C • FOCUS

Come Grow with Us! Fast Paced Opportunities.

BRANNON & TULLY

Programmers
Analysts
Project Mgrs
Sales/Mkting

BRANNON & TULLY, INC.

8201 Fairview Rd, Ste 200
Charlotte, NC 28210
704-552-6855

3189 Holcomb Br. Rd, Ste 875
Norcross, GA 30071
404-447-8773

PROGRAMMER/ANALYST

The News and Observer is seeking a degreed individual with proven experience in the maintenance of business applications software. We are moving from an HP3000 series 70 to series 960 and invite you to contact us if you have 2-3 years HP3000 programming experience using COBOL and IMAGE, and enjoy the testing and installation of new software releases, troubleshooting and user support. Powerhouse or Collier-Jackson financial software experience is highly desirable.

Qualified candidates should send resume including salary history to:

Personnel Department
The News and Observer
P.O. Box 191
Raleigh, NC 27602

The News and Observer

AS/400 S/38

GET TO THE HART OF THE BUSINESS...

...With Whittman-Hart, the largest diversified technical services company (dedicated strictly to the AS/400 and S/38 systems) in the country. Providing technical support to many of the top Fortune 20 companies in America, we are the consulting experts, committed to mastering technologies, attending to details and creating solutions. Our accelerated growth and phenomenal success has created a need for talented Data Processing PROFESSIONALS to share in a future of significant challenge and reward in a highly progressive team environment.

We currently require individuals with 2+ years solid System 38, RPGIII, COBOL experience and proficiency in any of the following:

- **Technical Consulting**
- **Design**
- **Education & Training**
- **Data Communications**
- **Project Management**
- **Product Development**

POSITIONS ARE CURRENTLY AVAILABLE IN CHICAGO, LOS ANGELES AND INDIANAPOLIS.

Get to the HART of challenge and reward at Whittman-Hart. We offer one of the finest compensation packages in the industry, including high earning potential, project diversity, incentives, paid insurance coverage, relocation allowance and other impressive benefits. Please send your resume in strict confidence to: **Jared Bobo, Manager of Recruiting, Whittman-Hart, INC., 377 East Butterfield Road, Suite 425, Lombard, IL 60148. (708) 971-2270.** Equal Opportunity Employer M/F.

Whittman-Hart

The Leader in the Midrange Solutions.

DATA BASE MANAGEMENT, INC.

THE FUTURE BELONGS TO THOSE WHO GET THERE FIRST.

As an experienced, career-oriented computer professional, you know that the future belongs to those who are most familiar with leading-edge technologies—DB2, SQL, 4GL, AD/Cycle, CASE and more.

We're DBMI, one of the nation's leading suppliers of information systems engineering, consulting and training to government and Fortune 500 companies. Together with American Management Systems (AMS), we represent over 2700 permanent employees in 23 cities and revenues exceeding $225 million. We've seen the future and we need you to help us claim it.

If you are a Programmer/Analyst, DBA, DA or Systems Programmer with experience in any of the areas listed, we want to talk to you today about where we'll both be tomorrow.

- **DB2**
- **IMS**
- **CICS**
- **CASE (IEF,IEW)**
- **JAD**
- **CSP**

We'll provide you with an excellent salary and benefits package, outstanding cash bonuses, training in the latest developing technologies, a variety of new and exciting challenges, and opportunities to travel.

For an informal discussion of your objectives, or to arrange for a personal interview, call **Jim Quinn at (203) 646-3264.**

Data Base Management, Inc.
300 Chapel Road
Manchester, CT 06040.
An Equal Opportunity Employer

DBMI
An AMS Company

Hartford, CT Wilton, CT
Alexandria, VA Richmond, VA Dallas, TX

Catch the Denso Spirit!

Nippondenso Tennessee, Inc. Is a leading manufacturer of automotive components. We are looking for a special group of people who want to be part of our new plant start-up operation.

If you are ready for the challenge of leadership and you have the skills and knowledge listed in this ad, then we want you on our team! Nippondenso Tennessee, Inc. is located in beautiful eastern Tennessee at the foothills of the Great Smoky Mountains and just minutes away from Knoxville. We have the best to offer in location and state-of-the-art technology. We are currently recruiting candidates for the following position:

Information Systems Specialist

Must be able to program in RPGIII/CLP within a S38 or AS/400 environment utilizing established programming standards; perform system/program analysis; perform feasibility studies. We require a BS degree in Computer Science with 2-3 years of experience in a manufacturing environment using MAPICS II, MAPICS DB, BPICS or a similar program. Must be a team player and have the ability to work well with others.

Nippondenso Tennessee, Inc. will match your talent and ability with an excellent salary and benefits package plus outstanding advancement opportunity. If you would like to join our team of quality people, send your resume, cover letter and salary requirements to: **Nippondenso Tennessee, Inc., Human Resources Department, P.O. Box 9710, Maryville, TN 37802-9710.** Equal Opportunity Employer.

DENSO

INFORMIX 4GL, "C" to 50K

Positions Located in Northern N.J.

FORTUNE 100 Company looking to add additional personnel to new development staff with at least 3 years experience.

REQUIREMENTS:
- 4 Year Degree
- US Citizen or Green Card
- Knowledge of PC environment

RELOCATION ASSISTANCE PROVIDED
Immediate Interviews Granted

Please forward resume to:
MICHAEL JAY ASSOC. INC.
201 Route 17 North, Suite 300
Rutherford, N.J. 07070
FAX: (201) 939-3391

APPLICATION PROGRAMMER ANALYST

OUR POWER IS OUR PEOPLE

As Florida's population continues to grow, so does Florida Power's need for professionals with powerful technical knowledge. We are currently seeking an individual with superior interpersonal and communication skills to work at our **Crystal River, Florida** facility.

In this position, you will participate in the analysis, design, development, implementation and support of computerized business applications. The ideal candidate will possess a minimum of 2+ years' relevant programming experience along with a Bachelor's degree. A working knowledge of ANS COBOL, TSO/ISPF, JCL, IDMS, ADS/O, CULPRIT, Data Base concepts and structured programming techniques is essential. Knowledge of ORACLE and CASE is highly desirable.

Florida Power Corporation provides an attractive salary in the mid 30's, an excellent benefits package, along with an extremely supportive work environment. Our Central Florida location offers affordable housing, recreational opportunities and the added bonus of no state income tax. For confidential consideration, please forward your resume, including salary history, to: Professional Staffing, Dept. CW/0625, Florida Power Corporation, Central/Northern Human Resources Office, 8202 West 7 Rivers Drive, Crystal River, FL 32629. No agencies, please. We are an equal opportunity employer M/F/H/V.

Florida Power
CORPORATION

THE SOURCE FOR GENERATIONS TO COME.

RESEARCH TRIANGLE OPPORTUNITIES

Currently recruiting experienced computer pros with background in any of the following: IBM COBOL; CICS; IDMS; IMS; ADS/O; ORACLE; INGRES; DB 2; UNIX; HOGAN; ASSEMBLER; AS400; DEC/VAX/VMS; ORACLE/C; CIM; POS; MSA; Financial; Mfg.; Banking; Insurance; MVS, VM, NCP/VTAM or CICS Systems Progrs; DEC/VAX Systems Mgrs; TANDEM; Adabas/Natural; PC LAN; Database Analysts. Partial lising of local, regional & nat'l fee paid positions. Call or write:

The Underwood Group, Inc.
3924 Browning Pl., Suite 7
Raleigh, NC 27609
(919) 782-3024
FAX (919) 783-0492

IDMS ADS/O

IDMS and ADS/O are in great demand with my clients in TN, SC, NC, VA, FL and KY. We have many openings for Programmers & Prog/Analysts with 0-5 yrs. experience in IDMS, and salaries from $28-45K. I also need a MANAGER OF APPLICATIONS PROGRAMMING with IDMS, 4 yr. degree and mfg. applications experience. Salary to $70K+ bonus. I also need several IDMS Data Base Analysts with salary to $50K.

Contact **JIM BOSTIC, PHILLIPS RESOURCE GROUP, P.O. Box 5664, Greenville, SC 29606** or call 803/271-6350 (D), 803/292-1181 (E), or 803/271-8499 (FAX).

Project Manager
MIS Department
Manhattan's East 60's

A challenging career opportunity exists for a qualified professional to manage and coordinate the activity of a development project team for the enhancement and implementation of systems.

Minimum of 5 years in data processing including at least 3 years experience in Project Management and/or Systems Analysis. A Bachelor's degree in computer science, MIS, engineering or business administration, and a working knowledge of business systems with heavy emphasis on system development requirements including systems analysis, design, documentation, testing and implementation procedures are definite musts. A thorough understanding of information system Life Cycle Methodology

Excellent fringe benefit package Qualified candidates are invited to submit resume, with salary history/requirements, to: **The New York Blood Center, RD/Human Resources, 150 Amsterdam Ave, NY, NY 10023.** Equal opportunity employer M/F.

New York
Blood Center

NETWORK OPERATIONS SUPERVISOR

The Johns Hopkins University Applied Physics Laboratory (APL) is a nationally recognized research and development organization. We are located midway between Baltimore, Maryland and Washington, DC on a 360 acre campus-like setting. Our Technical Services Department provides design, fabrication and documentation support to the Laboratory staff of engineers and scientists. The growth of network applications throughout the Laboratory has created a need for an additional member of the professional staff in that Department to exercise responsibility for network support and the supervision of the personnel providing that support.

We are seeking an individual with five or more years experience in network operations, implementation and support which includes significant responsibility in support of CAE/CAD workstations. Knowledge of TCP/IP, Novell Netware, token ring and IEEE 802.3 protocols, C Language, DOS, UNIX and VMS is also required. Systems programming experience in a UNIX or VMS environment and an educational background equivalent to a BS/MS in Computer Science are highly desirable. This individual will supervise seven professionals/technicians in providing Operations Support for networks which include a 40 node Appolo/Mentor CAE network, a 40 station ComputerVision CAD/CAM network and a Novell-based LAN with 90+ users. The network support responsibility will address reconfigurations as necessary to support growth, enhanced reliability and changing user needs; operating system upgrades; user training; and implementation of new network activities.

APL offers relocation reimbursement along with a comprehensive flexible benefits package, full tuition reimbursement for continuing studies, three weeks annual vacation, a generous retirement program, and salary commensurate with qualifications and experience. If you are interested in this opportunity, submit a resume which addresses your qualifications relative to the stated requirements along with your salary history to:

Recruitment Office
Department LER-646
The Johns Hopkins University
APPLIED PHYSICS LABORATORY
Johns Hopkins Road
Laurel, Maryland 20723

EOE M/F/H/V
U.S. Citizenship is Required

SOUTHEAST CONNECTION

- **IBM 30XX**
- **IBM 43XX**
- **IBM SYS 38, AS/400**
- **HP 3000**
- **VAX**

We currently need people with 2+ yrs. exp. as Prog/Analysts, Systems Analysts, Tech Support and Database for Southeast openings. We have been EDP recruiters since 1980. Please send your resume TODAY!

VIP Personnel, Inc.
3101 Guess Road, Suite C
Durham, NC 27705
(919) 471-6404
FAX (919) 471-4044

Systems Director/Consultant - Consult with member airlines to prepare & analyze proposals for passenger & cargo services, engineering & flight operations & management reporting, incl. scheduling, proration of ticket revenue & travel agency automation using knowledge of artificial intelligence software, equip. needs, forecasting technology development & business growth, competitive strategies, passenger processing procedures, financial/cost benefit analysis, centralized & decentralized computer systems. Reqts: Bachelor's in Math & 5 yrs. exp. in job offered or as Sr. Airline Industry Exec., Computer/Communications Systems & Operational Research. 9-5; $54,000/yr; 40 hr/wk. Apply in person or by resume to: GA Dept. of Labor, 2972 Ask-Kay Drive, Smyma, GA 30080, or to the nearest GA Job Service Center. Control #GA 5431770.

COAST TO COAST SERVICE

IBM • MF • MINI • PC

Placement of DP Professionals in Florida. Call or fax your resume today.

Prog/Analysts 30-45K
CICS, COBOL, OS/MVS, DB2, IDMS/ADSO, ADABAS/NATURAL

Software Engineers 35-55K
LAN, WAN, MULTILEX

Systems/Analysts 30-50K
CICS, DESIGN, DEVELOPMENT

ARI
Attn: Angela or Steve
3900 NW 79th Ave, Suite 210
Miami, Florida 33166
305-592-1455
Fax: 305-592-6963

CONSULTANTS WANTED

MVS/SMS
VTAM/NETVIEW
MAPPER • EASEL
IMS/MANUFACTURING
METAPHOR/DIS
TANDEM/PATHWAY/SQL
VM/CMS/FOCUS
DB2/CICS
AS 400
DEC WINDOWS

1-800-843-9119
FAX ANY TIME 212 764-3363
RMS COMPUTER CORP
1212 6TH AVE.,
17TH FL., NYC 10036

SENIOR TEST SYSTEMS DEVELOPMENT ENGINEER: Design & development of automated test systems for testing of radio products & sub-assemblies. Test systems involve operator-assisted testing & robotic systems. Design of computer vision testing systems of displays & labels, including software development, design of electronic circuits to allow interphase between units under test & automated test systems. Planning, scheduling & implementation of complex, sophisticated automated test procedures on paper components. Interact with development groups in helping to define tests. Participate in development of products. Interface with support groups to insure the highest quality test stations. Provide Support Groups with information. Provide guidance to engineers/technicians. Task leader for test systems projects. 8:00am-4:30pm. Mon-Fri. 40 hrs/wk. $43,000/yr. REQUIREMENTS: Bs.Sc. Electrical Engineering & 5yr/exp. in the job, OR 5yr/exp. as Development/Design Engineer. Experience must include: Software & design experience in Radio Frequency environment applying EIA standard 204C (3yrs.exp). Task Leader (1yr.exp). Project status tracking & presentation & appropriate tools (3yrs.exp). Feasibility studies, cost justifications, systems design & written engineering proposals (3yrs.exp). Software methods & application tools, including work stations & CASE tools (1yr.exp). Various tone & digital signalling schemes: two tone, 5/6 tone, GSC, POCSAG, 1200 Baud POCSAG (3yrs.exp). High speed communications with an understanding of handshake, collision recovery, device contention, data rate limitations, error detection & correction algorithms. Design exp. with active/passive filters. Operational amplifiers used as amplifiers, active filters, differential amps, level translators, differentiators & integrators (2yrs.exp). Software: Proven working familiarity with 680x, 68HC11 assembly language programming. Languages: BASIC, C Pascal, Fortran, UNIX operating systems. Language programming (3yrs.exp). Basic, C Programming & UNIX operating systems (2yrs.exp). FORTRAN/PASCAL (1yr.exp). Hardware: Familiarity with Hewlett Packard 300 series computer & test station related hardware (3yrs.exp). RESUMES TO: Job Service of Fla. 105 E. Broward Blvd., Ft. Lauderdale, Fla. 33301. Attn: J.O. #FL-0288758.

Great CONSULTING Assignments! and Exceptional FULL TIME Opportunities

Call & send your resume to

MIMI SIMON ASSOC.
90 West Street, Suite 1105
New York, NY 10006

(212) 406-1705
Fax # (212) 406-1768

ANALYST/PROGRAMMER

A South Carolina based international software firm is seeking qualified candidates to join their permanent staff. Candidates should have at least 2 years work experience in DOS/VSE or MVS environments with on-line and batch applications using COBOL, VSAM and CICS. Those not meeting these minimum requirements need not apply. DL/1 and distribution experience a plus. This employee-owned company offers a unique opportunity in a fast-paced professional environment. Salary is commensurate with experience. Qualified parties should submit their resume, complete with salary requirements, to:

Analyst/Programmer Search
P.O. Box 10266
Charleston, SC 29411

COMPUTER PROGRESS UNITED
$40,000 to $60,000

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for **P/A** in **Kentucky, Ohio, Indiana,** and **Tennessee. We are the DB2 Specialist!**

DB2/SQL
IMS ▪ CICS

Send resume or call:
Computer Progress United
12730 Townepark Way
Louisville, KY 40243
(502) 245-6533

When you compare costs and the people reached, Computerworld is the best newspaper for recruiting qualified computer professionals.

Place your ads today!

Call toll-free
800-343-6474
Or in Mass
(508) 879-0700

DP PROFESSIONALS

Unprecedented growth has created a need for us to expand our staff. We seek talented Programmers, Senior Programmer/Analysts, DBA's and Systems Managers to work at our client's IBM or DEC sites. Current needs include.

IBM

- * CICS, DL/1
- * CICS, DB2
- * INQUIRE DB
- * NATURAL 2/ADABAS
- * AMAPS
- * DB2, DATABASE ANALYST
- * IMS DB/DC, DL1

DEC

- * VAX, NATURAL/ADABAS
- * VAX CLUSTER MANAGER
- * VAX, RdB
- * VAX INGRES, FORTRAN
- * VAX, ORACLE, SQL FORMS
- * VAX, FORTRAN, CORTEX
- * VAX, FORTRAN, CDD

ACP is an established, 11-year old consulting firm offering state-of-the-art work environments, excellent compensation packages, relocation and professional visibility. If your skills match any of the above qualifications, send your resume TODAY! (Degree preferred).

AMERICAN COMPUTER PROFESSIONALS

140 Stoneridge Drive
Suite 350
Columbia, SC 29210
(800) 332-0555
equal opportunity employer
m/f

A Terrific Opportunity

Computer Consulting Group, one of the **Southeast's** fastest growing contract programming and consulting firms, has immediate openings for talented Programmer-/Analysts with 2 or more years experience. Excellent salary & benefits package. We're especially seeking:

NATURAL/ADABAS
CICS/COBOL
IMS DB/DC
IDMS/ADSO
TECH. WRITERS
LIFECOM
DB-2
SYS. PROGRAMMER
VAX/FORTRAN/COBOL
UNIX/C
PL-1/COBOL
VAX/C/INGRES
AS400/COBOL
I-CAD
IDEAL/DATACOM

Computer Consulting Group
Contract Professional Services

Research Triangle Area
4109 Wake Forest Rd
Suite 307
Raleigh, NC 27609
1-800-222-1273
(803)738-1994
FAX (803)738-9123

DP CONSULTANTS

I spent 19 years as a consultant and was very frustrated in my search for consulting companies that would treat me with HONESTY and PROFESSIONAL INTEGRITY. This Mid-West consultant company believes THAT is the ONLY way to do business. We will:

1. Tell you the bill rate;
2. Pay you a high percentage of the bill rate;
3. Tell you our profit margin;
4. Keep promises we make.

Give us a call, or send a resume—we'll prove it.

We have clients with needs for individuals with 2+ years of practical experience in the following:

- VAX - VMS, C
- VAX - COBOL or Fortran, with Oracle or RDB
- IBM - COBOL, IMS/DB/DC or CICS
- IBM - COBOL, IDMS, ADSO/CICS
- IBM - COBOL, DB2
- AS400 - COBOL or RPG III
- HP 3000 - COBOL, MPE
- Honeywell - COBOL, GCOS 3 or 8

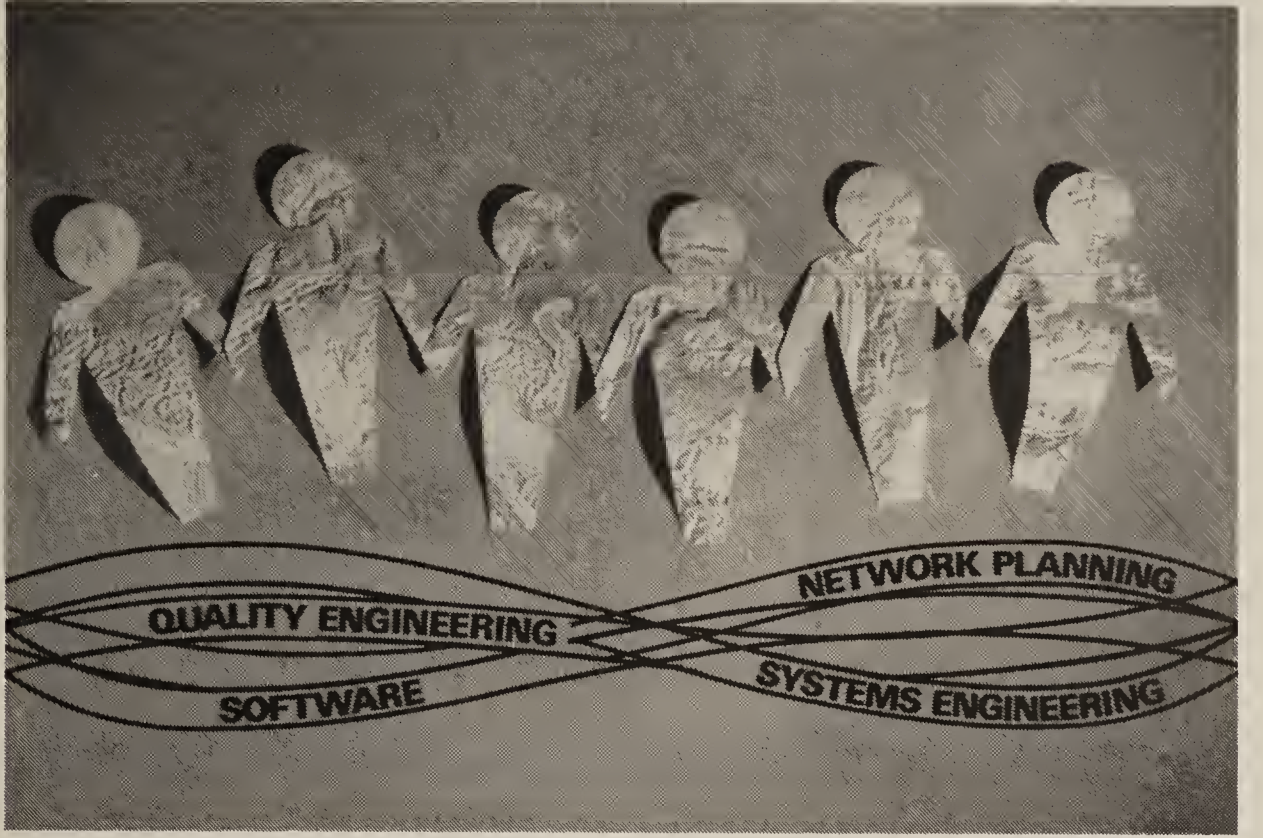
J M Ross & Assoc., Inc.

P.O. Box 1724,
St. Louis, MO 63043-0621
(314) 434-1976/
FAX (314) 434-0952

NACCB Member

AT&T Bell Laboratories

MISSION POSSIBLE



Our mission is—and always has been—to help people communicate better.

Today, at AT&T Bell Laboratories, this means planning for and designing a future in which networks will link and fully exploit machine intelligence, allowing people to move information in any form—voice, data or video—anywhere in the world at anytime.

The technologies needed to achieve our mission are evolving at a startling rate and, because we are forging these frontiers, we are ideally positioned to apply our findings creatively.

Our environment is alive with expectation, challenging work, and opportunities to learn more.

In this environment, we have remarkably talented individuals from a wide variety of technical backgrounds working together to develop the growing range of information systems and services now in demand and from which open networks of the future will emerge. Every person's contributions are important and are supported by excellent resources.

Our mission, as we perceive it today, is possible. Join us in making it a reality.

Opportunities are available at our facilities in New Jersey, Illinois and Ohio for people who can create forward-looking solutions, evaluate alternative architectures, perform competitive analyses, assess service viability, define, implement and measure systems or develop strategies to get products to market.

If you have a Master's or PhD in Systems Engineering, Computer Science, Electrical Engineering, Mechanical Engineering, Mathematics, Physics, Statistics or Operations Research with software and/or hardware experience, or a BS in these fields with a minimum of 5 years' highly relevant experience, please send your resume to:

Director, Technical Employment
AT&T Bell Laboratories
Dept. 70-5226-90
101 J.F. Kennedy Parkway
Short Hills, NJ 07078-0905

An equal opportunity employer

Specific expertises being sought:

- Communications planning
- Competitive analysis
- Computer graphics
- Computer networking
- Data communications protocols/networking
- Database design
- Digital networks/services
- Digital signal processing
- Expert systems
- Image processing
- International standards and applications
- ISDN
- Local area networks
- Management and technology consulting
- Market definition for new technologies and services
- Measurement systems
- Network optimization tools
- Network planning and design
- Operating systems
- Operations engineering
- Optical undersea cable: system planning, reliability, and digital terminal design
- OSI protocols
- Packet switching
- Performance measurement and analysis
- Program planning
- Real time systems software
- Reengineering consulting
- RF design
- Simulation and modeling
- SNA network design and operations
- SNA protocols and systems engineering
- Software development tools
- Subjective testing
- Switching systems
- System testing
- Systems architecture
- Systems integration
- Systems planning
- Transmission systems
- UNIX networking and software
- UNIX™ systems applications

AT&T
The right choice.

CICS Programmer/Analyst to 38,000

Opportunities exist in the St. Louis area for top-notch CICS Programmer/Analysts that desire challenge and upward mobility. These companies offer state-of-the-art technical environments, heavy emphasis in new development and disignated career paths. If you seek great benefits and dynamic technical environments, Call.

ROBERT HALF
Information Systems

7733 Forsyth
St. Louis, MO 63105
1-800-922-HALF
FAX: (314) 727-1321

Senior Database Analyst w/Bachelors in Comp Sci, Engg or Math & 2 yrs exp in data modeling, data analysis, logical & physical relational database design using DB2 & 4 yrs exp in data processing in application dev & design, including IMS DB/DC & CICS exp. Requires in-depth knowl of IBM software dev methodology using CICS, IMS DB/DC, DB2 & SQL/DS for COPICS software & systems packaging & install using IBM MVS SMP/E and VSE MSHP. Exc oral & written communication skills req'd. Perform formal data modeling/normalization for IBM Relational Database, dev standards/procedures for integration of data using COPICS mfg system. Supervise System Analysts, Prog/Analysts & System Progs in pkg/install COPICS using MVS SMP/E & VSE MSHP. Dev physical file designs using DB2, SQL/DS, IMS DB/DC, VSAM, execute DBMS utilities. Travel foreign/domestic. $45-75/hr. Resumes only to: Georgia Department of Labor, 2972 Ask-Kay Drive, Smyrna, Georgia 30080, or to the nearest Georgia Job Service Center. Control #GA 5431956.

INFORMATION SYSTEMS ANALYST

The Haskell Company, a leading design/construct firm, is seeking a staff level Information Systems Analyst for an immediate opening in our Jacksonville, Florida corporate office. Qualified candidates will have a bachelors degree or equivalent professional experience, 3-5+ years application design/development experience in a business information processing environment, plus experience in structured analysis and design. Our ideal candidate will have worked in a VAX/VMS environment and have experience in ORACLE, PC networks and payroll/HR applications.

We provide a professional working environment with an excellent salary and benefits program. If you are qualified and interested, please send your resume with salary expectations to: Data Management Recruiter, The Haskell Company, P.O. Box 44100, Jacksonville, FL 32231-4100. Equal Opportunity/Affirmative Action Employer.

IBM • VAX

We place DP professionals nationwide and have over 300 affiliated offices to assist you. Call or fax your resume today!

AS 400 P/A	32-45k
Sys 38 P/A	30-40k
30xx, Cobol, P/A	33-45k
MVS/XA Sys/Prog	40-50k
CICS P/A	35-45k
IMS or IDMS P/A	32-40k
Oracle/Ingres/RDB P/A	35-48k
Adabas/Natural	36-44k
VAX Cobol P/A	35-42k
MAPICS P/A	30-36k
DB2/SQL DBA	40-50k
DB2/SQL P/A	35-45k

MAU, INC.

ATTN: Lori Braswell, Dept. CW
501 Greene Street
Augusta, GA 30901
(404) 722-6806
FAX (404) 722-1884

Sunny Virginia Beach

Immediate Openings for Individuals experienced In:

- ○ IDMS/R, ADS/O
- ○ IDMS/R DBA
- ○ CICS
- ○ DB2

METRO,
an Information Technology Services consulting company, offers excellent compensation, benefits and challenges.

Call, FAX, or mail your resume in confidence to

METRO
Information Services, Inc.

Cindy Biggs
P.O. Box 8888
Dept. 600CW
Virginia Beach, VA 23450
(804) 486-1700
FAX (804) 431-8215
EOE

We Just Invested $4 Million To Sharpen Our Cutting Edge.

That's what it took to complete our new, state-of-the-art Data Processing Center, which is among the most sophisticated in the country. But you'd expect nothing less from Roses, one of the largest regional mass retail merchandisers in the Southeast. And still growing.

What that means to Computer Professionals is this: becoming part of our DP Center will enable you to work on extremely challenging and diverse projects. You'll be interacting with Roses' entire operations universe, including marketing, distribution, sales, finance and human resources. And you'll do so in a great environment with an impressive group of bright, talented people. An environment that offers you freedom to do your best work, and where reward and recognition aren't merely empty semantics.

So if you like working on technology's cutting edge, then come hone your skills at Roses. Join us.

Manager— Computer Operations

The ideal candidate will have a four-year degree (preferred, but not required) and 10 years' minimum experience in Data Processing. Strong people and interpersonal skills are required as well as knowledge of organizing and directing a large multiple IBM mainframe shop. Experience with MVS XA CICS, TSO, UCC scheduling, JCL, PROC's and the demands of a 24-hour, 7-day operation is a necessity. Knowledge of network control activities and large satellite and terrestrial networks desired. The successful candidate must also demonstrate sound financial skills with management of a $5 million budget. The ability to initiate and demonstrate results with special projects is also beneficial.

CA Datacom Systems Programmer

You should have at least three years' experience supporting CA (ADR) DATACOM DB, DATACOM DD, IDEAL, and LOOK. Your background should include installation, maintenance, performance evaluation and tuning. MVS-XA experience is a must with CICS, TSO and SME-E a plus. A four-year degree is preferred, but all strong candidates will be considered.

Programmer Analyst

You should have 3-5 years of Systems Development experience in an IBM MVS environment, COBOL programming experience, on-line and database design/development experience, 1-2 years of systems analyst experience, and at least a 2-year Associate's degree. Additionally, experience in retail, CICS development, DATACOM products-IDEAL, DATACOM and a four-year degree are preferred.

In addition to an excellent starting salary and extensive benefits package, including a stock purchase plan, profit sharing retirement plan, 401(k) plan, health life insurance, merchandise discounts, relocation assistance and more, Roses also offers you an unsurpassed opportunity for advancement.

Please send your resume with salary history to: Jim Anderson—Human Resources, Roses Stores, Inc., P.H. Rose Building, Henderson, NC 27536.

An Equal Opportunity Employer

Roses
DISCOUNT STORE

---

* * IMMEDIATE OPENINGS * *

TANDEM

Triple-I is expanding its technical staff due to unprecedented growth. We offer stability, complete benefits package, education, competitive salaries in a high-tech environment.

We currently have the following opportunities available for high quality TANDEM experience professionals:

- **Test Engineer/QA** - demonstrated ability to produce successful test plans on Tandem Platform.
- **Programmer** - 1-3 years - COBOL/SCOBOL in a PATHWAY environment ... SQL is a +
- **Programmer Analyst** - 2-5 years - COBOL/SCOBOL some TAL, PATHWAY ... SQL is a +
- **Senior Programmer Analyst** - 3-7 years COBOL/SCOBOL - SQL in a PATHWAY environment.
- **Communication Specialist** - 3-7 years data processing (Tandem), excellent TAL skills, experience with Telecommunication protocols.
- **TAL Senior Programmer/Analyst** - Senior level TAL expert with applications experience and/or systems knowledge.
- **TAL Programmer** - 1+ years experience in applications environment.

Remember ... it takes two to TANDEM. WE have the opportunities, all we need is YOU.

CALL 1-800-444-8101
ASK FOR DANNY OR SHELLEY

iii

Triple-I
P.O. Box 411838
Kansas City, MO 64141
1-816-444-8816 FAX

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you large numbers of professionals who work in your industry.

When you're recruiting computer professionals, it's often important to find ones with experience working on systems specific to your industry. From manufacturing to banking, healthcare to insurance, Computerworld reaches the right people in every major industry.

Number of Computerworld Readers with Experience in Key Industries (Entire Career)

Job Industry	of Computerworld's Audience ...
Computer Vendor and Consulting	147,897
Computer Manufacturer	79,521
large-scale computers	37,110
medium-scale computers	45,938
small-scale computers	33,851
personal computers	47,758
technical workstations	24,889
Software Vendor	130,589
for large-scale systems	57,561
for medium-scale systems	74,967
for small-scale systems	61,274
for personal computers	76,787
for technical workstations	26,379
Non-CPU Computer Products Manufacturer	36,994
VAR/dealer/retailer	27,557
DP Service Bureau/contract DP Services	53,077
Consulting/planning	86,677
Manufacturer (not computers)	168,664
Insurance	52,910
Healthcare	64,729
Banking/financial Services	97,953
Government - federal/state/local	110,399
Business Service (except DP)	40,108
Communications Systems	28,913
Public Utilities	54,364
Transportation	26,031
Wholesale/retail Trade	111,095
Education	125,184

SOURCE: Skill Survey of Computerworld's Audience, May 1989.

To place your ad regionally or nationally, call John Corrigan, Classified Advertising Director, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
The weekly newspaper of record for computer professionals.

SAN FRANCISCO BAY AREA

Our client base is expanding. We are seeking candidates with the following skills:

• DB2	Application Development Data Base Design
• IDEAL	Applications Development
• HOGAN	Systems Software Development

THE SEARCH FIRM, INC.
595 MARKET STREET, SUITE 1400, SAN FRANCISCO, CA 94105
(415) 777-3900 FAX 777-8632

SUNBELT & ATLANTA

$25,000 to $95,000

IDMS/ORACLE/DATACOM/IMS/DB2
VAX/MAPICS/FOCUS/SYS38/AS400
TECHWRITERS/DP SALES/TANDEM

Need Programmers, Programmer/Analysts for Full-Time and Consulting Positions in IBM Shops. Relocation Expenses Paid. Send resume to:

Jim Heard, EDP Consultants, Inc.
3067 Bunker Hill Road, Suite 202
Marietta, Georgia 30062

24-HOUR FAX: 404-973-4052
PHONE: 404-971-7281

MISSISSIPPI STATE UNIVERSITY Computing Center and Services is seeking applicants for a full-time UNISYS 1100 Systems Programmer position. This person will be involved in installing and maintaining UNISYS 1100 system software for the university's mainframe computer system.

Minimum Acceptable Qualifications: A bachelor's degree in Computer Science or a related field. Programming experience in a UNISYS 1100 mainframe environment. UNISYS 1100 assembly language or PLUS programming experience. Experience with one or more high level languages such as Fortran, Cobol or Pascal.

Additional Desirable Qualifications: Systems programming experience on UNISYS 1100. Experience with COMUS, the UNISYS software installation and maintenance tool. Experience with TIP, DMS, MAPPER, TELCON, and CMS1100.

The primary responsibility of this position is to provide systems programming support for the mainframe computer systems used at MISSISSIPPI STATE UNIVERSITY for academic, research and administrative computing. Salary up to $32,000 commensurate with qualifications and experience.

Deadline for receipt of applications is July 2, 1990. Send vita/resume to:

Gerald A. Matthews, Director
Computing Center and Services
Mississippi State University
P.O. Drawer CC
Mississippi State, MS 39762

MISSISSIPPI STATE UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER.

THE UNIVERSITY OF OKLAHOMA
HSC
HEALTH SCIENCES CENTER

The University of Oklahoma Health Sciences Center is seeking applications for Assistant Director of Research & Education Computing Services.

This is a 12 month full time position reporting to the Director of Computing Services, responsible for managing the Academic Computer Center - A centralized function supporting the Academic Requirements of the campus. The successful candidate will be highly motivated and creative with strong organizational and supervisory skills.

The Assistant Director providing technical, programmatic, and consulting support to the Academic departments; conducting training in computer use and applications; coordinates hardware/software purchases and works with students in computer laboratory.

Qualifications: Master's degree in Biostatistics, Computer Science, Mathematics, or a related field, or equivalent experience. Five (5) years experience in the direction, control, and/or supervision of a university or university affiliated computing facility.

Submit a resume, name and contact information for three (3) professional references, and a letter of interest stating specific qualifications which would merit your consideration for this position to: Personnel Services, University of Oklahoma HSC, P.O. Box 26901, OKC, OK 73190.

Deadline for Application: Position will remain open until filled. Evaluation of applications will begin: July 23.

FLORIDA

We are Romac & Associates, specialists in the data processing industry. Currently our technically sophisticated clients have requirements for:

- PROGRAMMER ANALYSTS
- SYSTEMS PROGRAMMERS AND OTHER
- MIS PROFESSIONALS

WHO HAVE EXPERIENCE IN ANY OF THE FOLLOWING AREAS:

- IBM-MVS
- CICS
- COBOL
- ASSEMBLER
- TANDEM/TAL
- IMS
- IDMS
- DB2
- CASE TOOLS
- M&D/MSA
- SYSTEM 38
- AS-400
- RPG III
- FOCUS
- INGRIS
- HP/VAX
- C

Our clients offer top salaries and a perfect climate. Please send your resume or call any of our consultants.

1 Harbour Place #880C
Tampa, FL 33602
(813) 229-5575

ROMAC.

Professional Recruiters
All fees are assumed by our client companies.

UNISYS PROGRAMMERS

We are currently the largest group in the country engaged exclusively in the permanent placement of UNISYS Programmers & Analysts throughout the United States.

If you have 2-10 yrs. programming experience on any UNISYS computer we may have situations appropriate to your technical, personal & geographic interests. Our service is free to candidates.

COMPUTER STAFFING
Call 800/88UNISYS

CAREER/SCOPE™

With Opportunities Like This, The Sky Is No Longer The Limit.

Provide Vital Business Systems Support For Some Of The Most Exciting Space Programs Around

Find Out Why SCG Is A World Leader In Commercial Satellites

Use Your Experience In:

- IDMS
- COBOL
- ADS/O
- JCL
- MVS
- Software Implementation
- Customer Service

Call 24 Hours A Day, 7 Days A Week 800-221-3333, Ext. R28

At Hughes Aircraft Company's Space & Communications Group (SCG), you can put your data processing skills to work with the world's leader in sophisticated commercial satellites and commercial communication systems. You'll work in a challenging environment, unlike any other. You'll be able to develop advanced business application systems within a systems company. That makes your contributions absolutely critical.

We currently have the following opportunities:

- **PROJECT LEADERS**
- **PROGRAMMER ANALYSTS**
- **PROGRAMMERS**
- **USER SUPPORT PERSONNEL**

At Hughes, you'll enjoy excellent task diversity, developing material applications and providing systems integration across applications and across multiple projects throughout our entire organization. And through strong customer support we've created a 2 year project backlog to ensure continued professional challenge.

Because we're a systems company, we understand your professional needs. That's why we offer dual career paths. You can either progress in your technical discipline or advance into a supervisory role. But that's not all. With our Southern California location, you'll enjoy an unlimited variety of coastal lifestyle advantages.

Hughes Aircraft Company offers an attractive salary and an outstanding benefits package, including tax-deferred savings; medical, dental and vision care coverage, plus paid time off between Christmas and New Year's.

For immediate consideration, please call 800-221-3333, Ext. R28, 24 hours a day, 7 days a week. If unable to call, send your resume to: Hughes Aircraft Company, Space & Communications Group, Dept. WC-62590, P.O. Box 92919, Los Angeles, CA 90009. Proof of U.S. citizenship may be required. Equal Opportunity Employer.

HUGHES

SPACE & COMMUNICATIONS GROUP

PROGRAMMER/ANALYST
(AS400 - S/38)

The fastest expanding furniture retailer in the country is seeking self-motivated professionals to join its state-of-the-art MIS staff. Our company is progressive and continually pursuing the leading edge in technology. This commitment to growth and success has created new challenges.

We offer to our employees:

- CHALLENGE
- COMPETITIVE SALARY
- BENEFITS PACKAGE
- CAREER ADVANCEMENT
- TECHNICAL DEVELOPMENT

We require 2-5 years experience on the IBM 38 or AS400 and a thorough knowledge of RPGIII programming. Experience with retail applications and a college degree are highly desired.

Please forward resume to:

HEILIG-MEYERS CO.
Dawn Tomlinson
2235 Staples Mill Rd.
Richmond, VA 23230

Please include salary requirements or salary history.
No Phone Calls Please

COMPUTER DIRECTORIES

ORDER YOURS TODAY!

- Identifies Mainframe, Midrange and Mini-Computer Installations
- Hardware/Software Configurations
- M.I.S. Management Contacts
- Cross-Referencing Indexes
- Industry Type

Call For
The D.P. Blue Book
In Your State(s).
CALL 1-800-827-8338

IRG™

Sr. Information Services Engineer—CAD/CAE

Walt Disney Imagineering is the creative energy behind the Walt Disney theme parks. If you have the talent, the experience and the drive to turn imagination into reality, we need you.

©Disney

In this position you will be responsible for first assessing the design and engineering information flow at Imagineering and then establishing long and short term systems architecture direction for the selection, training and use of appropriate CAD/CAE technologies. This includes workstations, centralized vs. distributed processing, input/output devices, programming interfaces and technical standards. You will supervise the I.S. staff responsible for CAD end-user training, configuration and implementation. This will require close consultative interaction with all levels of line and executive management regarding CAD/CAE process and technology issues.

Walt Disney Imagineering offer an outstanding benefits package and a creatively charged work environment. After all, what would you expect from mthe Company who is in the business of making people smile? For immediate consideration, please send your resume to: **Walt Disney Imagineering, 800 Sonora Avenue, Glendale, CA 91221-5020, Attn: Human Resources Dept. JL-CW.** Equal Opportunity Employer.

Walt Disney Imagineering©

Immediate Openings For TPF Professionals.

HYPERION W.W. & Associates has been providing top quality TPF consulting and contract services for years. And with offices in Amsterdam, Dallas, Singapore and London, our experience spans the globe.

We now have immediate openings for qualified professionals with expertise in airline applications. Applicants should be extremely quality conscious, reliable and professional.

Assignments are available to qualified applicants in a wide variety of locations.

For information on immediate openings in the United States, call our Dallas office at 1-800-992-4873.

HYPERION W.W. & ASSOCIATES
Amsterdam • Dallas
London • Singapore

4004 Beltline Road, Suite 150
Dallas, Texas 75244
VOICE: 800-992-4873
FAX: 214-980-7712

HYPERION

Now you can recruit the right people in the right places at the right price

Let us introduce you to the IDG Communications Computer Careers Network. It's the new advertising service that lets you run the most targeted and cost-efficient recruitment program possible.

It's many options help you recruit qualified computer and communications professionals -regionally or nationally - with combination buys of up to five leading newspapers. And all together the Computer Careers Network delivers your message to an audience of well over 1 million qualified computer professionals.

Target your ad placement. You can place your advertising exactly where you want. If you wish to recruit within a specific area, you can advertise in the regioal editions of the newspapers you choose - East, West, or Midwest. or you can extend your reach by running in two regions - or even nationally. Plus - you can still take advantage of stand-alone national rates for individual newspapers.

Reach qualified professionals cost efficiently. Gone are the days when you have to worry about paying for waste circualtion. The Computer Careers Network lets you buy the newspapers that will deliver your recruitment message to qualified professionals you need to reach.

To put the new Computer Careers Network to work for you -regionally or nationally - call the sales office nearest you, or contact **John Corrigan,** Classified Advertising Director, at **800-343-6474** or in Ma., **508-879-0700.**

One quick phone call can give you all the information you need on running your recruitment advertising in up to five leading industry newspapers.

Data Processing Consulting

Star Quality UNIX Developers!

$40,000 to $70,000 to Start!

If you've got what it takes to be a Star, **SEI Information Technology** can help you put your name in lights! SEI has been a national leader in the information systems business for more than 20 years and has a staff of over 150 outstanding professionals. We help our clients tackle their toughest problems — building the core systems that are critical to their business.

Ground-floor Opportunity In Central Florida!

Join a multi-faceted, Unix-based development project, just beginning in the Orlando, Florida area. The work includes:

- Product Planning and Execution
- Software Development
- Local and Wide Area Networks
- Artificial Intelligence
- Image Processing
- Electronic Publishing

These are permanent, full-time positions. Relocation assistance is available, both to Orlando now and to your next SEI city at project end 2-3 years downstream.

Other Opportunities in Chicago & LA!

SEI also has similar long-term career opportunities available in Chicago and Los Angeles. We offer outstanding technical challenges, top salaries, personalized benefits, professional growth, and the best co-workers in the industry.

We're looking for people who:

- Thrive on challenge and hard work
- Learn fast and work smart
- Know how to use technology to solve real-world problems

We'd like to see this demonstrated by at least 3 years of solid C and Unix system development experience. For confidential consideration, send resume to:

SEI information technology

Larry Dunn, Area Manager
Department C625U
450 East Ohio Street
Chicago, Illinois 60611

– An Equal Opportunity Employer –

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

For over two decades, Computerworld has delivered qualified job candidates to America's employers.

And ever since Computerworld's first weekly issue in 1967, America's companies have relied on Computerworld to target America's most qualified computer job candidates.

To place your ad regionally or nationally, call John Corrigan, Classified Advertising Director, at **800/343-6474 (in MA, 508/879-0700).**

HELP WANTED: Director, Software Engineering. SEND RESUME TO: (Within 30 days of publication) Employment Division, Attn: Job Order Number 0850017, 875 Union Street N.E., Room 201, Salem, Oregon 97311. JOB DESCRIPTION: Management of a software development group, supervising the design, implementation, testing, integration and maintenance of case (Computer Aided Software Engineering) tools, planning and release of products with marketing and worldwide sales organization. REQUIREMENTS: Ph.D. in Computer Science plus three years of related occupation experience in management of software development groups. The three years described under related occupation to include experience in C and ADA Compilers, software engineering environments, and software tool construction, plus setting technical directions and defining system architecture. SALARY: $1,538 per week, with no overtime. POSITION OFFERS: Prevailing working conditions, 40 hours per week, 8:00 a.m. to 5:00 p.m., Monday through Friday. Position In Beaverton, Oregon. ON-THE-JOB TRAINING NOT OFFERED. EQUAL OPPORTUNITY EMPLOYER. MUST HAVE PROOF OF LEGAL AUTHORITY TO WORK IN THE UNITED STATES.

SOFTWARE OPPORTUNITIES

1-800-423-5383

Let our National Award winning computer specialists assist you in your search. We have over 300 affiliated offices around the country ready to work for you!

LIFE INSURANCE	To $60K
UNIX INTERNALS	To $60+
SYSTEM/38	To $40K+
IDMS, IMS or ADABAS	To $50K
P/A (COBOL or ALC)	To $40K
UNIX/C	To $55K
MVS or VM INTERNALS	$ OPEN
ACF/VTAM/NCP	To $50K
DB2/SQL	To $60K+
COBOL/CICS	To $40K
Software Engineers	To $80K
OVERSEAS	$ OPEN

ROBERT SHIELDS & ASSOCIATES
P.O. Box 690723, Dept. C
Houston, TX 77289-0723

FAX: 713-486-1496

Systems Analyst: Responsibilities center around call processing flow tool development, developing a knowledge-based user-friendly system which displays the states of telephone call processing scenario & the performance of network switching system & the functionality of software modules. Position also requires office engineering system software development (developing an Integrated application level graphic system using queuing model to analyze the data which supports the data engineering work in a computer network). Requires a Master's Degree in Computer Science. Experience not required but graduate research OR thesis must be in the field of switching system performance analysis. Graduate studies must have included one course in each of the following: Queuing Model (for Communication), Computer Network, and Computer Graphics. Salary $39,000/Yr., 40 Hrs. P.W., 8-5, no o.t., M-F. Send resumes to: Illinois Department of Employment Security, 401 S. State Street-3 South, Chicago, IL 60605. Att: Robert Felton, Ref. #V-IL 1568-F. An Employer Paid Ad.

ADABAS/NATURAL

Programmers, Analysts, & DBA's

Join the best ADABAS/NATURAL team. Immediate openings for programmers, analysts, designers, DBA's, and trainers. Several positions available in the southwest and in the Washington DC area. Minimum 1 year experience with ADABAS/NATURAL. Send resume to:

LOGIC UNLIMITED, INC.
1420 Springhill Road, Suite 150
McLean, VA 22102
Attn: Pat White
(703) 827-5740

★ GET OUT ★ OF TOWN

NATIONWIDE OPPORTUNITIES

YOUR HOME TOWN MAY HAVE MANY JOBS, BUT NOT YOUR CAREER OPPORTUNITY. THE COMPUTER-TECH NETWORK OF 60 NATIONAL COMPUTER SEARCH AGENCIES SPECIALIZES IN THE PLACEMENT AND PAID RELOCATION OF COMPUTER PERSONNEL TO ALL AREAS OF THE U.S.A.

(216)-356-9990
FAX # (216)-356-9991
TOLL-FREE 1-800-752-3674

COMPUTER TECH NETWORK

21010 Center Ridge Rd.
Rocky River, Ohio 44116

CAREER MOVE OVERDUE?

Get back on track with a challenging learning experience that offers career growth in a high tech work environment. If you consider yourself a "top gun" who wants to get in front of the decision maker, work with the most prestigious companies in **Florida** and have 3+ years of experience with one of the following skills:

AA/DCS	FOCUS
DB2/SDL	ORACLE
AS400/RPG III	UNIX/C
MVS/M&D	IMS/DB/DC
TANDEM/PATH	S/P MVS
CICS/COB	CASE TOOLS
INFORMIX	MVS/ALC

then call or send resume to
COMPUTERPEOPLE, Dept. C1

12225 28th Street N
St. Petersburg, FL 33716
813-573-2626

20 N. Orange Avenue, Ste. 1400
Orlando, FL 32801
800-888-1064

2005 W. Cypress Creek Rd., Ste 3
Ft. Lauderdale, FL 33309
800-777-8603
305-771-8603

COMPUTERPEOPLE

Software Engineer II in a Computer Integrated Manufacturing development group responsible for the design and development of highly reliable software to control equipment used in a semiconductor manufacturing facility. Tasks include the creation and testing of such software modules, their deployment into production, subsequent software operation monitoring and maintenance and responsibility for operator training and support. Tasks also include participation in the acceptance process of newly purchased semiconductor equipment, especially as it relates to the communication software interface. Requirements are a Master's degree in Industrial Engineering and Operations Research with (2) years experience applying computer solutions to a production environment. Background in the areas of computer science and software development techniques and VAX/VMS operating systems is required. Knowledge of equipment communication protocols, flexible manufacturing systems, analysis and control of production systems, fault tolerance computing techniques and Pascal and C languages is required. Salary: $37,772.00 to $40,772.00 per year. 40 hr/wk, 8:15a.m.-5:00p.m. If you are interested in and qualified for the above position, please forward two (2) copies of your resume to J.O. #00611, Commonwealth of Massachusetts, Department of Employment & Training, Special Programs, first floor, 19 Staniford Street, Boston, MA 02114.

DATA PROCESSING

Manufacturer/distributor of medical products seeking MANUFACTURING SYSTEMS ANALYST to support division manufacturing personnel with the following systems/software services: 1) need indentification, requirement definition, systems modeling and design, user training and technical support; 2) current software review and modification, new software development and implementation. 40 hours/week. Starting salary $34,343/year. REQUIREMENTS: knowledge of MRP based manufacturing applications, JIT concepts, statistical forecasting and simulation, Fortran programming, good communication skills. B.S. Degree in Manufacturing/Industrial Engineering, with 2 years on the job experience, or M.S. Degree in Manufacturing/Industrial Engineering, (ABD status acceptable), with NO experience required. The job order number for this job opportunity is 736595. Please apply at Overland Park Employment & Training Office, 8417 Santa Fe Drive, Overland Park, Kansas 66212, Tel. Number 913-642-8484. Application must include resume, proof of legal authority to work in the U.S., and must refer to job order number.

ADABAS/NATURAL CONSULTANTS

ADABAS/NATURAL
Programmer/Analysts to DBA's
needed for
CONTRACTUAL positions nationwide.
3+ years exp. required.

These positions won't last long!

ADEPT

36 Washington Street
Suite 310
Wellesley Hills, MA 02181
(617) 239-1700

ROBERT HALF

R-H ®

INFORMATION SYSTEMS SPECIALISTS

You Need a Specialist.

RPG III P/A

Several hi tech companies based in San Jose, CA are in need of 20+ RPGIII professionals w/financial, distribution or mfg experience. Excellent career growth opportunities.
$60K SJC102

CICS INTERNALS SPECIALIST

New Seattle division of national software vendor is building development & performance monitoring tools for CICS. Systems and applications programming exp required. Exciting growth oppt'y.
$50+K SEA102

VAX COBOL P/As

Major San Francisco based company seeks seasoned DEC VAX VMS COBOL programmer analysts with 2+ years financial and/or distribution systems exp. Knowledge of SYBASE or other SQL database a plus.
$40K SFO102

DB2/ORACLE

Nat'l consult firm seeks indivs w/3-10 yrs, DB2/ORACLE for SR's, mgrs & 10-15 yrs BIG 6 consult mgmt exp for managers/partners. Exc. benefits, full relo. Jobs in Atl, Balt/Wash, Calif. Call San Diego for details.
$50-120K SAN102

PROG/ANALYST

Work at the Beach in Los Angeles! Highly visible direct mail co seeks P/A with IBM Mainframe Assembler/VM/VS1 and Direct Mail experience.
$40+K LAX100

JD EDWARDS

Several Houston area businesses are looking for programmers and system analysts with a good working knowledge of JD EDWARDS software. Experience with IBM midrange systems is required, System 38 or AS400 is preferred.
$45K HOU102

PROG/SYSTEMS ANALYST

Leading office products manufacturer is seeking experienced EDI applications analyst. Exp w/COBOL, PANVALET, CICS & IBM Mainframes is a must! Database exp. a plus.
$35K OKB103

SR PROGRAMMER/ ANALYST

Electrical manufacturing company in western suburbs of Chicago seeks P/A with 5+ yrs experience in manufacturing with expertise in LAN, Revelation, and RPG II to lead migration of mainframe applications to PC networks.
$40K OKB104

SYSTEMS/ ANALYST

Great opportunities exist w/outstanding Chicago firm beginning a major DEC/VMS development. Must have min. 4 yrs exp w/systems configurations, capacity planning, feasibility studies, system timing & performance analyzing in a DEC/VMS environment.
$57K CHI104

CASE Specialist

Hartford area firm seeks CASE specialist for hands-on role in exciting new projects. Opportunity to have major impact in industry leader. Hi growth, excellent benefits, full relo.
$40-50K HTF103

SENIOR P/As

Great opptys in Minnesota for HP3000/Powerhouse professionals. Req's 3-5 yrs exp. & exc communication skills. Dynamic team environment. Exc growth potential!
$40K BLO102

P/A

Major Texas corporations require your development skills at multiple locations. Proficiency with COBOL, ADABASE, NATURAL and MVS/XA... Excellent compensation. Dial RH Job Board Modem 214/987-1957.
$45K DFW102

P/A - S/A - P/L

Escape to Wisconsin! Several FORTUNE 500 Manufacturing firms have growth related MAINFRAME openings. Two plus years MVS COBOL required with at least one of the following: CICS, IDMS, 4th G.L. Manufacturing environment a must. Full Relocation.
$35-50K MKE100

IBM CICS & RPG III PROFESSIONALS

Top Robt. Half Phila/Del Valley clients are staffing new development projects in IBM VM, MVS, and AS/400 environments. Outstanding positions exist for programmers through Team Leaders with 2+ years of IBM COBOL CICS or RPG III exp.
$50+K PHL102

P/A through S/A

With strong Cobol skills. Large national company seeks aggressive self-motivated individual. Background in CICS or IDMS a plus. Call Southfield, MI office for details.
$30-43K STF104

AS400 COBOL

Growing manufacturing company seeks Systems Analyst. MRP or MAPICS experience preferred. Call Southfield, MI office for details.
$40K STF105

SYSTEM ANALYST

Multi-Million Florida Corp with dual AS400 currently seeking several professionals with JD Edwards Software. Your background must include S/38 or AS400, RPGIII. Excellent career oppty.
$47K MIA100

- Call the Robert Half office nearest you -
(please refer to the underlined six digit job code)

California
Los Angeles
(213) 386-6805
FAX (213) 487-0826

San Diego
(619) 291-7990
FAX (619) 296-8784

San Francisco
(415) 434-1900
FAX (415) 434-0705

San Jose
(408) 293-9040
FAX (408) 293-1509

Connecticut
Hartford
(203) 278-7170
FAX (203) 278-0320

Florida
Miami
(305) 447-1757
FAX (305) 445-2474

Illinois
Chicago
(312) 616-8200
FAX (312) 616-1155

Oakbrook
(708) 571-7074
FAX (708) 571-0405

Michigan
Southfield
(313) 358-2300
FAX (313) 358-0941

Minnesota
Bloomington
(612) 893-9585
FAX (612) 893-0833

Pennsylvania
Philadelphia
(215) 568-4580
FAX (215) 561-4434

Texas
Dallas
(214) 363-3300
FAX (214) 373-7480

Houston
(713) 623-4700
FAX (713) 623-6782

Washington
Seattle
(206) 624-9000
FAX (206) 624-5093

Wisconsin
Milwaukee
(414) 271-4253
FAX (414) 271-7836

Wauwatosa
(414) 771-4110
FAX (414) 771-5094

© 1990 Robert Half International Inc.

NETWORK DESIGN ENGINEER required. Responsible for development, programming, monitoring and analysis of communications software and protocols to provide connectivity to outside data processing systems and to interface with public and private networks. Monitors and tailors software operating system parameters in VMS environment. Provides technical expertise in the area of VMS/VAX communications software and in local area networks. Will work closely with operations research engineers. Software development in Pascal and Basic Assembler coding. Worksite: Fort Worth, TX. Applicants required to have bachelors degree in math, computers or engineering with at least two years VMS/VAX analysis and Assembler programming experience. Annual salary will be $36,000 per year for a 40-hour work week. Additional salary up to $42,000 per year may be paid if education and experience warrant. Interested applicants apply at the Texas Employment Commission, Dallas, TX, or send resume to the Texas Employment Commission, Austin, TX 78778-0001, J.O. number 5424623. This advertisement was paid by an equal opportunity employer.

SOUTHEAST & NATIONAL DP

PA - COBOL/CICS	$35K
PA - IDMS/ADSO	$36K
PA - MSA	$40K
PA - UNIX, SQL	$45K
SA - ADABAS	$46K
DA - INQUIRE/VM	$50K
PA - VAX & C	$50K
Comm. - TCP/IP	$60K
Sr. PA -34/36	$35K
SP - DB2	$55K
PA - Mfg., CICS	$38K
SONET	$60K
PA's - COBOL/OS	$30K
PA - INFORMIX	$30K
PA - C/ORACLE	$40K

Many other positions available. Call for information.

DOROTHEA SAMS

PHILLIPS RESOURCE GROUP
P.O. Box 5664
Greenville, SC 29606
803/271-6350 (D)
803/292-5667 (E)
803/271-8499 (FAX)

COUNTY OF ORANGE CALIFORNIA

DIRECTOR OF INFORMATION SYSTEMS

The County of Orange is currently seeking a dynamic individual to assume a high-profile responsibility managing a large professional and technical staff. Specific responsibilities will include managing County-wide data processing services, telephone services, public safety radio communications, and cable television franchise administration. The ideal candidate should possess at least four years of increasingly responsible administrative experience demonstrating an ability to manage such an organization.

Send resumes to: John R. Schlosser, Ph.D., Heidrick & Struggles, Inc., 300 South Grand Avenue, Suite 2400, Los Angeles, CA 90071. (213) 625-8811.

Classified

MIS PROFESSIONALS

E-Systems Garland Division, a major supplier of our nation's high technology electronics has immediate opportunities for professionals with expertise in the following areas.

BUSINESS SYSTEMS ANALYST/PROGRAMMER

We are seeking an MIS professional with a minimum of four years COBOL experience in manufacturing or financial application systems development with a Bachelor's degree in Computer Science or Business (equivalent experience will be considered). Candidates will be analyzing information needs, designing systems, and coding programs in an IBM MVS-XA environment. Experience in IDMS/R relational database and ADS/O is highly desirable.

DATABASE ADMINISTRATION

The successful candidate will have a BS degree in Computer Science or related discipline plus a minimum of five years' applications development experience. This experience must include Database Administration with Cullinet's IDMS/R in an MVS environment. Familiarity with Cullinet IDMS/R tool set desirable.

E-Systems offers competitive salaries and an outstanding benefits program that includes medical and dental insurance, a 401(k) plan, and a company-paid Employee Stock Ownership Plan.

Send your resume and salary history to: Reba McCarroll, Senior Staffing Representative, E-Systems, Inc., Garland Division, Department 41, Post Office Box 660023, Dallas, Texas 75266-0023.

E-SYSTEMS
The science of systems.

U.S. Citizenship Required.
An Equal Opportunity Employer, M/F,V,H.

Computer Professionals Expect NCA To Increase Their Earnings And Benefits . . . and that's what we do Better than anyone else!

Earnings and benefits are probably not your only reasons for working… but they're certainly high on everyone's priority list.

By using the services of an NCA firm you are automatically assured of superior professional representation…consultants who are vastly experienced and knowledgeable in the art of negotiation.

Employers, having worked with us for many years, are pleasantly responsive to our recommendations because we have a long established reputation with them for our honest and fair negotiations.

So, if you suspect that your earnings and benefits are less than they should be…Come in. Call. Or mail your resume to the NCA firm nearest to you. No charge to you ever for any of our excellent services.

National Computer Associates

ATLANTA: DataPro Personnel Consultants
1050 Crown Pointe Pkwy, Suite 430
Atlanta, GA 30338 (404) 392-9990
BOSTON: Robert Kleven & Co., Inc
P.O. Box 636
Lexington, MA 02173 (617) 861-1020
CHICAGO: Thomas Hirtz & Associates
150 North Wacker Drive, Suite 1700
Chicago, IL 60606 (312) 977-1555
CINCINNATI: Task Group
7875 Reading Road
Cincinnati, OH 45237 (513) 821-8275
CLEVELAND: Innovative Resources, Inc
Statler Office Tower, Suite 426
1127 Euclid Avenue
Cleveland, OH 44115 (216) 621-4220
COLUMBUS: Michael Thomas, Inc
450 W. Wilson Bridge Road, Suite 340
Worthington, OH 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants, Inc
13355 Noel Road, Suite 2001
Dallas, TX 75240 (214) 661-8600
DENVER: Abacus Consultants, Inc
1777 South Harrison Street, Suite 404
Denver, CO 80210 (303) 759-5064
DETROIT: Electronic Systems Personnel
3000 Town Center, Suite 2580
Southfield, MI 48075 (313) 353-5580
GREENSBORO: DataMasters
P.O. Box 14548
Greensboro, NC 27415-4548
(919) 373-1461
HARTFORD: Compass, Inc
875 Asylum Avenue
Hartford, CT 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc
1980 Post Oak Boulevard, Suite 1050
Houston, TX 77056 (713) 626-4100
KANSAS CITY: DP Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, KS 66202 (913) 236-8288
LOS ANGELES: Superior Resources, Inc
22653 Pacific Coast Highway, Suite 1-106
Malibu, CA 90265 (818) 884-3000
MIAMI: Data Sciences Personnel, Inc
P.O. Box 8577
Hollywood, FL 33084 (305) 434-6112
MILWAUKEE: EDP Consultants, Inc
Chancellory Park II, Suite 350
350 N. Sunnyslope Road
Brookfield, WI 53005 (414) 797-8855
MNPLS./ST. PAUL: Electronic Systems Personnel
880 International Centre
900 2nd Avenue South
Minneapolis, MN 55402 (612) 338-6714
NEW JERSEY: Systems Search
2040 Millburn Avenue
Maplewood, NJ 07040 (201) 761-4400
NEW YORK: Botal Associates, Inc
7 Dey Street, Suite 410
New York, NY 10007 (212) 227-7370
PHILADELPHIA: Systems Personnel, Inc
115 West State Street
Media, PA 19063 (215) 565-8880
PHOENIX: Professional Career Consultants
4725 North Scottsdale Road, Suite 209
Scottsdale, AZ 85251 (602) 274-6666
PITTSBURG: KCS Computer Services, Inc
400 Penn Center Blvd, Suite 320
Monroeville, PA 15235 (412) 823-8632
ROCHESTER: Traynor Confidential Ltd
10 Gibbs Street, Suite 400
Rochester, NY 14604 (716) 325-6610
SAN DIEGO: Technical Directions Inc
8880 Rio San Diego Dr, Suite 1025
San Diego, CA 92108 (619) 297-5611
SAN FRANCISCO: Professionals for Computing, Inc.
455 Market Street, Suite 1850
San Francisco, CA 94111 (415) 957-1400
SEATTLE: Houser, Martin, Morris & Associates
110 110th Avenue N.E., C-90015
Bellevue, WA 98009 (206) 453-2700
STAMFORD: Hipp Waters Professional Recruiting
707 Summer Street
Stamford, CT 06901 (203) 357-[illegible]
ST. LOUIS: Executive Career Consultants
795 Office Parkway, Suite 100-CW
St. Louis, MO 63141 (314) 994-3737
SYRACUSE: The CFA Group Inc
5790 Widewaters Parkway
Dewitt, NY 13214 (315) 446-8492
AUSTRALIA: For information, contact the NCA firm nearest to you

---

This Space for HIRE! CALL:

800-343-6474

in MA.,
508-879-0700,
ask for
John Corrigan,
Classified
Advertising
Director.

Computerworld

Weekly.
Regional.
National.

And it Works!

Manufacturing Principal Engineer Responsible for research and development on the characterization and improvement of hot carrier effects and transistor lifetime. This involves understanding hot carrier effects, developing the necessary techniques for the prediction of transistor lifetimes, and ensuring that the developed techniques are adopted by the other teams directly concerned. Analyze the hot carrier data obtained to ensure that the tolls are being used correctly, and that any process or design modifications resulting in changes in the predicted behavior are incorporated into the characterization tool. Gives support by measurements and interpretation to other teams needing the expertise involved. Participate in issues concerning transistor reliability, in order to ensure that fabricated devices meet the lifetime specification, and to make others who might be concerned aware both of the various aspects of the hot carrier problem, and also of the risks resulting from process/design changes. Keep informed of developments, both in the device reliability field, as well as how process and circuit changes impact on the reliability issue. Assist in the hiring and supervision of the personnel needed and planned for the group, as well as providing inputs on capital equipment and other resources needed for planned projects. Requirements are a PH.D. degree in physics or Electrical Engineer with 5 years experience in MOS device physics including the ability to use the device simulation programs MINIMOS and SPICE. Knowledge of MOS transistor device physics is required. Knowledge of MOS transistor hot carrier effects with recognized contribution to the field, knowledge of dielectric properties and interaction of dielectric properties with transistor characteristics, expertise with cryogenic operation and characterization of MOS transistors is required. Salary: $61,006.00 per year. 40 Hrs. per week 8:15 a.m. to 5:00 p.m. If you are interested in, and qualified for the above position, please forward your resume to: Massachusetts Division of Employment and Training, Special Programs Department, 19 Staniford Street, Boston, Ma. 02114. Case #00708.

★ LEARN CASE TOOLS ★

DB2 • CICS • IMS DB/DC • IDMS/ADSO

International leader in Hardware/Software Vendor Industry currently seeking CICS & DB2 P/A's to learn CASE TECHNOLOGY!

- Highly Competitive Starting Salary!
- Generous Expense Account!
- Work only on new IBM products!
- Positions in So. Cal., USA & overseas!

ALSO NEW DATA CENTER!

CICS/DL1 • IMS DB/DC • M&D/MSA
DB2 • IDMS/ADSO • VTAM • MVS/ESA

PROGRAMMER/ANALYSTS:
ALL NEW DEVELOPMENT IN SO. CALIF.
SYSTEMS/PROGRAMMERS:
PERFORMANCE & TUNING. INSTALLATIONS & CONVERSIONS. INTERNALS KNOWLEDGE A PLUS!

Call RICK DEANS Today!
213-278-6339 FAX: 213-658-1599
9100 WILSHIRE BLVD., SUITE 442 BEVERLY HILLS, CA 90212

PROGRAMMER/ANALYST -In a consulting environment partake in analysis, design, development, implementation, testing, documentation of database applications and presentation skills for education clientelle in database language and technologies. Require Bachelor's in a Quantitative Discipline and 3 years experience including FOCUS/ADABASE, ADABASE/NATURAL, FOCUS and Database Design Methodology. Salary: $40,000 per annum. Job location: El Segundo, CA. Resume to: Janice Mae Janeczek, 300 Continental Boulevard, Suite 290, El Segundo, CA 90245.

VAX/COBOL SAN FRANCISCO

We have 12 openings for DP professionals with 3+ years VAX/Cobol exp. The selected candidates must possess strong background in Financials, Transportation or Manufacturing. Positions available throughout S.F. Bay Area. For immediate consideration, please call or forward your resume to:

ICC, Inc.
415-397-2325
FAX: 707-765-1231
41 Sutter St.
San Francisco, CA 94104

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld reaches more highly skilled computer professionals than any other newspaper or magazine --Sunday, daily, or trade.

612,703 of them to be exact. And this audience is even verified by the Audit Bureau of Circulations (ABC), the largest independent auditor of publication circulations. And from JCL to Unix Professionals, DEX VAX to IBM PC professionals, these job candidates have the skills your company needs.

To place your ad regionally or nationally, call John Corrigan, Classified Advertising Director, at **800/343-6474 (in MA, 508/879-0700).**

"By the end of the first month, our ad in Computerworld's Classified Marketplace had paid for itself five times over."

— Rick Sprowl
Partner
BL Associates, Inc.

At BL Associates in Hanover, MA, business means much more than buying, selling, and trading Data General and compatible hardware. It also means providing customers with innovative solutions. According to Partner, Rick Sprowl, their 60 years plus of combined experience and "shirt-sleeve" approach to customer service are what keep buyers and sellers coming back again and again.

"Our business, the purchase and sale of computer hardware, obviously revolves around equipment — processors, terminals, printers, and disk drives, for the most part. So we're always on the lookout for prospects who either have Data General or compatible hardware, such as CDC, Data Products, Printronic or Fujitsu, to sell or are looking for used equipment to buy. To target our audience of end users in companies of all sizes and in every industry, we advertise in Computerworld *'s Classified Marketplace — and get great results.*

"In advertising response, Computerworld *'s Classified Marketplace outperformed the others two to one. So we know that's where end users see our ad every week. By the end of the first month, our ad in* Computerworld *'s Classified Marketplace had paid for itself five times over. Now, having scaled down our advertising efforts,* Computerworld *is the only industry trade publication we advertise in. And, based on results, we definitely plan to keep our weekly Classified Marketplace contract in place.*

"While ad response and sales are key, Computerworld *'s Classified Marketplace also plays a critical role in helping people promote BL Associates' image both nationally and internationally. We want to tell end users everywhere about our dedication to helping them find the best and most cost-effective equipment alternatives. Through personalized attention to customer service, our goal is to establish more and more ongoing relationships and, in turn, keep building the company's solid base of satisfied customers.*

"Our advertising in Computerworld *'s Classified Marketplace has clearly exceeded all expectations. We carefully track advertising results, so we know* Computerworld *'s Classified Marketplace is helping introduce BL Associates to a powerful base of users worldwide. Recently I even received a call from Israel, and that's one more serious prospect only* Computerworld *'s Classified Marketplace could have delivered."*

Computerworld's Classified Marketplace. It's where computer buyers meet computer sellers. Every week, sellers and buyers like BL Associates advertise in *Computerworld*'s Classified Marketplace because it reaches over 612,000 information systems professionals. And because it works! To put your classified message into the hands of America's most powerful audience of buyers, call John Corrigan, Classified Advertising Director, at 800/343-6474 (in MA, 508/879-0700).

COMPUTERWORLD
CLASSIFIED MARKETPLACE
Where all computer buyers and sellers can go to market.

MARKETPLACE

DOS programs meet Unix

Software and add-in boards make PC applications at home with Unix

BY SIMSON L. GARFINKEL
SPECIAL TO CW

You can have your cake and eat it, too.

The IBM Personal Computer and the DOS operating system revolutionized the world of low-cost computing. However, when 10 or more people are working together, it is often more cost-effective to invest in a single high-performance minicomputer than in a network of personal computers. And for users who want features such as electronic mail, security, remote access and shared peripherals, a minicomputer running the Unix operating system does by design what many PC-based networks do only with difficulty and at great expense.

However, many organizations need to run DOS applications. They are generally cheaper, easier to use and frequently more powerful than anything in the Unix world. Many have no Unix counterpart; few software publishers are willing — or even able — to port their DOS applications to a Unix platform.

Many users moving from DOS to Unix would like to continue taking advantage of investments in DOS software, as well as the time their people have invested in learning DOS. With more than 40 million DOS-based PCs worldwide, more prospective employees know DOS than any other operating system.

That's why plug-in boards and software packages that allow Unix computers to run DOS programs have been growing in popularity. The boards, such as Sun Microsystems, Inc.'s SunIPC, replicate an IBM PC-compatible, using the host computer for the screen, keyboard, disk and printer. Unfortunately, like real PCs, the boards cannot be shared by more than one user at a time.

Another approach is to simulate the instruction set of Intel Corp.'s 8086 or 80286 PC microprocessors. Simulators, such as SoftPC from Insignia Solutions, Inc., let computers such as the Apple Computer, Inc. Macintosh or Sun workstations run DOS software. A simulator requires no additional hardware, but the "simulated PC" runs slowly: A DOS program running under SoftPC on a workstation will run only about as fast as it would run on an IBM XT or — on the fastest workstations — at the pace of an IBM AT.

For people running Unix on Intel's 80386 and I486 chips, there is a third choice: Merge and VP/IX, two programs that can create "virtual PCs" using the "virtual 8086" mode of these advanced chips.

Each Merge or VP/IX process simulates an IBM PC, complete with a copy of MS-DOS. Running on top of DOS is a program called a redirector that intercepts all file I/O calls and maps them to the appropriate Unix calls, so the DOS application has full access to all of the files stored under Unix. This makes it easy to share files between DOS and Unix, as well as between DOS users on the same machine or over the network.

Both Merge and VP/IX let several DOS applications run simultaneously in windows or on a single terminal, using appropriate multiscreen software. DOS applications can even run on a serial terminal or over a modem.

Merge is also available for the Intel 80286. Because the 80286 does not have a virtual 8086 mode, Merge 286 must run the DOS application in "real" mode. Thus, only one DOS program can be run at a time, and an ill-behaved one can crash the entire system.

Both Merge and VP/IX allow Unix programs to be run from DOS and vice versa. Accounts can be set up so that the user logs into DOS, bypassing Unix.

I've been using VP/IX on a 20-MHz 80386 computer since late last year. On the PC's keyboard and display, DOS applications run only a little more slowly than they would if I were running DOS instead of Unix — still faster than they would run on an 80286. The biggest benefit, however, is the ability to quickly swap from DOS application to DOS application and back into Unix without rebooting.

Unfortunately, Merge and VP/IX do not work with every DOS application. One problem is the complexity of DOS, which is littered with different ways of performing similar functions. Each function must be emulated perfectly by the redirector. Bugs in a redirector will prevent the running of some, but not all, applications. The Santa Cruz Operation supplies VP/IX with a list of programs that work with it; people interested in buying the product should consult that list first.

A second problem arises from the fact that a virtual PC isn't really a PC. Many communications packages, time-sensitive applications and programs that attempt to directly read and write disk sectors will not always run as expected. Most copy protection schemes won't work either. DOS programs that require special plug-in boards, such as laboratory acquisition software, will generally not run.

Merge was written by Santa Monica, Calif.-based Locus Computing Corp. VP/IX was written by Interactive Systems, also in Santa Monica. Companies such as AT&T and The Santa Cruz Operation resell the programs for their own Unix offerings.

For an in-depth discussion of Merge and VP/IX, I recommend the book *DOS meets Unix*, published by O'Reilly & Associates, Inc. in Cambridge, Mass., and available in most computer book stores.

Garfinkel is a free-lance writer and computer consultant based in Cambridge, Mass. He is writing a book about computer security.

Index

Marketplace 110
Buy/Sell/Lease 110
Conversions 112
Bids Proposals/Real Estate .. 112
Graphics/Desktop Pub 112
Software 112
Peripherals/Supplies 112
Time/Services 112
Training 114

Buy/Sell/Lease

IBM SPECIALISTS
SELL • LEASE • BUY
S/34 S/36 S/38 AS/400
3741 3742
- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670
IN TENNESSEE (615) 847-4031
CMA
COMPUTER MARKETING
of America, Inc.
PO BOX 71 • 610 BRYAN ST. • OLD HICKORY, TN 37138

CANADA SITES
IBM 43XX & 30XX
(1200 sites)
IBM 3X/400
(2800 sites)
VAX
(2100 sites)
VARS
(650 sites)
☞ Discs – d-base or ASCII
☞ MIS Yearbooks for 1990
Who's Who Database
(416) 271-1601
FAX 271-4522

Buy Sell
RT
RS/6000
SERIES/1
3X,AS/400
937X
4300
Lease Rent
Currently replacing Series/1's with the new RS/6000 line via EDX to AIX migration
612·942·9830
DATATREND Inc
10250 Valley View Road
Suite 149
Eden Prairie, Minnesota 55344

WANG
Buy-Sell or Trade
VS PC OIS
Systems in Inventory
VS 7000 / 100 / 85 / 65 / 6 / 5
And Peripherals
4230A • 4230 • Laser Printers
PC/386sx Workstations
Genesis Equipment Marketing
Phone (602) 948-2720 Fax (602) 948-0615

Prime
Experienced
Systems
New & Used
Peripherals
Worldwide Service
Buy - Sell - Lease
OTW, Inc
305 Union St
Franklin MA 02038
508-520-0250

WE BUY DEC
(916) 638-5606

The BoCoEx index on used computers

Closing prices report for the week ending June 15, 1990

	Closing price	Recent high	Recent low
IBM PC Model 176	$425	$660	$250
XT Model 086	$500	$700	$350
XT Model 089	$700	$825	$475
AT Model 099	$1,050	$1,375	$850
AT Model 239	$1,075	$1,325	$700
AT Model 339	$1,200	$1,400	$900
PS/2 Model 50	$1,300	$1,700	$1,050
PS/2 Model 60	$2,500	$2,600	$2,400
Compaq Portable II	$1,475	$1,725	$1,400
Portable III	$2,175	$2,500	$1,900
Portable 286	$1,700	$2,000	$1,500
Plus	$675	$750	$650
Deskpro	$825	$900	$800
Deskpro 286	$1,400	$1,625	$1,300
Deskpro 386/16	$2,500	$2,750	$2,475
Apple Macintosh 512	$375	$775	$275
512E	$450	$450	$350
Plus	$1,150	$1,275	$1,000
II	$3,250	$3,500	$3,050

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Buy/Sell/Lease

Want to Buy

3287 Printers or Parts

In as is
or good
working
condition

Call:
Computer
Service
Supply Corp.

603-437-0634
Fax: 603-622-0128

Buying Selling

DEC - SUN
Data General
Plus
All Peripherals

Call DCC
617-837-7255
or
301-750-7200

FOR SALE

IBM 9370
Model 90

- 16 MB memory
- 1.6 GB DASD (9335)
- Workstation controller
- ASCII subsystem
- 9347 tape drive
- printers, terminals

Call
(916)-752-2145

Computerworld's

Classified Marketplace

needs only
6 days notice
to run your ad!

When you're selling, you want your advertising to hit the market quickly and frequently. You can't afford to wait for an issue that's coming out several weeks -- or -- months -- into the future. With Computerworld, there's no waiting for the next available issue because we've got one waiting for you every week. What's more, your ad can appear in the Monday issue of Computerworld if you order it as late as 6 days prior to the issue (Tuesday).

So if you're selling computer products or services, advertise in the newspaper that won't keep you waiting. Advertise in Computerworld's Classified Marketplace!

For more
information, call:

800/343-6474
(in MA, 508/879-0700)

HONEYWELL
LEVEL 6 DPS 6
SERIES 16

- Complete Minicomputer Line -- New & Used
- All Peripherals & Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery Low Prices
- HDS 5 and HDS 7 Compatible Terminals

The Recognized Leader
In Honeywell Minicomputer
Sales and Support

BCS

BOUDREAU
COMPUTER SERVICES
100 Bearfoot Road
Northboro, MA 01532
(508) 393-6839
FAX 508-393-3781
"Since 1974"

HEWLETT PACKARD

1000 ● 3000
9000

Computers
Peripherals
Terminals

Buy ● Sell
Rent ● Lease

EURODATA INC.
2574 Sheffield Road
Ottawa, Canada K1B 3V7
613-745-0921
FAX: 613-745-1172

PRIME

EXPERIENCED
SYSTEMS AND
PERIPHERALS

BUY-SELL-LEASE
BROKERAGE

NEW PLUG-COMPATIBLE
DISK, TAPE, MEMORY

PLUS
THE FASTEST I/O
AVAILABLE ANYWHERE

1ST SOLUTIONS, INC.
11460 N CAVE CREEK RD
PHOENIX, AZ 85020
ASK FOR DON SHIFRIS
602-997-0997
Fax: 602-997-1888

CDLA Member Computer Dealers & Lessors Association

9370's
That's All
We Do!

From 20's to 90's
Most Machines,
Peripherals &
Features
IN STOCK

Call us for a quote
708-831-1255
Executive Infosource
1530 Eastwood Ave., # 100
Highland Park, IL 60035

CDLA Member Computer Dealers & Lessors Association

CLASSIFIED MARKETPLACE

Where Computer
Professionals Shop

(800) 343-6474
(In MA: 508/879-0700)

IBM **BUY · SELL · LEASE**

Member
Computer Dealers
& Lessors Association
CDLA

9370
4381

SYSTEM
36/38

AS/400

POINT
OF
SALE

SERIES
1

- Processors
- Peripherals
- Upgrades

DEMPSEY & ASSOCIATES INC

18377 Beach Blvd., Suite 323
Huntington Beach, CA 92648 (714) 847-8486

(800) 888-2000

HP HP HP HP

NEW and USED
1000 ● 3000 ● 9000
Including Spectrum

BUY ● SELL ● TRADE ● RENT ● LEASE
Processors ● Peripherals ● Systems

All in Stock - Immediate Delivery
All warranted to qualify for manufacturer's maintenance

ConAm Corporation
It's Performance That Counts!
800/643-4954 213/829-2277
FAX 213/829-9607

VAX RENTALS

MV 3600
MV 3800/3900
VAX 6000 SERIES
VAX 8000 SERIES
Systems & Peripherals

- Fast Turnaround
- Dependable Products
- Upgrade/Add-On Flexibility

- 6 Months
- 12 Months
- 24 Months

BROOKVALE ASSOCIATES

CDLA Member Computer Dealers & Lessors Associates
dda Digital Dealers Associates

EAST COAST
(516) 273-7777

WEST COAST
(206) 392-9878

CALL US LAST

GET YOUR BEST PRICE
THEN CALL
COMPUTER BROKERS, INC.
WE
Buy - Sell - Lease
New and Used IBM Equipment
AS400 - System 36, 38, 43XX

SHORT TERM RENTALS

Call 800-238-6405
IN TN 901-372-2622

ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

COMPUTER BROKERS, INC.
2978 Shelby St., Memphis, TN 38134

'Since 1974'

B&F Associates inc

- Data General
- Fujitsu
- Data Products
- CDC
- Printronix
- Zetaco

BUY SELL
TRADE

617/982-9664

FAX:
617/871-4456

New/Reconditioned
digital IBM
Equipment

Whatever your requirements are for Digital & IBM Equipment, call CSI *first!* Buying, selling, trading, leasing, consignments - we do it all!

CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is ***eligible for DEC or IBM maintenance.***

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.

CSI Compurex
Systems, Inc.
83 Eastman St,
Easton, MA 02334
Call Toll-Free
1-800-426-5499
In Mass. (508) 230-3700
FAX (508) 238-8250

ICE LTD.
INTERNATIONAL COMPUTER EXCHANGE LTD.

1-800-ICE-BUYS

digital
Data General
SUN
apollo
IBM
PC/AT/PS2

BUY • SELL • LEASE • NEW • USED
PERIPHERALS • SYSTEMS • UPGRADES

RECONDITIONED COMPUTER EQUIPMENT

Whatever your Equipment needs are. Call us today whether you are buying, selling, trading, leasing or consignments-with 14 years in the trade - *ICE, Ltd does it all.* All our equipment comes with a 30 day *unconditional guarantee.*

WANTED

EXCESS AND OBSOLETE
COMPUTER EQUIPMENT
$ TOP CASH PAID $
- Call today for quote -
1-800-ICE-BUYS

INTERNATIONAL COMPUTER EXCHANGE, LTD.
TEL.: (617) 585-8888 • FAX: (617) 585-9177
• 163 MAIN ST. • KINGSTON, MA 02364 •

STK - R22

20 GBYTE

$50,000

Tom
913-491-3663

HONEYWELL

NEW/USED EQUIPMENT

- All Models
- Ultimate Equipment
- Older Equipment Available
- Buy-Sell-Lease-Trade

PARTS & REPAIR
FULLY GUARANTEED
PROMPT DELIVERY

Call: Level 6 Systems
1-216-951-2221

BULL

WE BUY and SELL
NEW - USED - AS IS
APOLLO, DEC, HP, SUN, WANG
CDC, MAXTOR, MICROPOLIS
Fax us your excess listings
Call us for current inventory on above

Industrial
Electrosurplus
Tel (508) 768-3480
FAX (508) 768-3479

1-800-67890-IBM®

The only number you need to know when buying, selling or leasing IBM® equipment.

IBM IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES INC

NEWPORT LEASING, INC. • 2943 Pullman St. • Santa Ana, CA 92705-5818
OFFICE: 714/476-8476 FAX:714/476-9200

GTEX FINANCIAL GROUP, Inc

IBM

BUY SELL
LEASE

PS/2 OPERATING
LEASES

3084 3090
PERIPHERALS

OEM/PCM
LEASES

800-888-7568
FAX 214/783-1379

Member CDLA

EST.
1978

Conversions

CONVERSION EXPERTS

Family of integrated software tools that automate the following conversions:

- DOS to MVS
- DOS/MVS to AS400
- Honeywell to IBM
- Assembler to Cobol
- CICS Macro to Command
- Any Cobol to Any Cobol
- Basic to Cobol

Specific methodologies for:

- Conversion factory
- Conversion project management
- Conversion feasibility and planning
- Technical conversion

Products & services on your site or ours. Fixed fee or T&M with guaranteed delivery dates.

IBM Business Partner

NEOSYNETICS, INC.
2860 Des Plaines Avenue,
Suite 375
Des Plaines, Illinois 60018
708/299-0900

Bids/Proposals/Real Estate

COMPUTER FACILITY FOR SALE

- IBM Equipment
- Furniture and Fixtures
- Attractive Facility Lease Terms Available

Located in Center City Philadelphia; convenient to all public transportation.

■ **DATA CENTER - 6,380 Sq. Ft. Raised Floor**

Environment - A/C, power, chilled water, central halon and state-of-the-art detection and protection systems.

Computer Equipment - IBM 3090, 3380 DASD, 3480 tape drives, laser printer, microfiche processor, network control console, etc.

■ **DATA CENTER OFFICE SPACE - 12,360 Sq. Ft. Raised Floor**

43 spacious modular workstations, 5 private offices, conference room and document library.

For more information please call: (215) 668-6790

FOR: LEASE OR SALE

DATA CENTER

Location Ft. Lauderdale
Boca Raton, Florida

- Over $2,000,000 of leasehold and specialty equipment.
- 12,800 sq. ft. with elevator
- Security, Halon, U.P.S. Liebert Systems
- Approximately 7,000 sq. ft. computer flooring
- Approximately 500 telephone lines and P.B.X. switch

For more information contact:

Joe Stapleton
Phone: 305-563-7733
305-943-5305

5800 Sq. Ft. Data Center

Indianapolis
Outerbelt location
- Fully equipped
- 38 floor cuts
- Halon Annunciator
- 125 KVA UPS
- 2-7,000 Sq.Ft. office space available
- Suitable for disaster recovery hotsite or time share

Call: William Meyer
703-893-7638

612,00 MIS/DP Professionals see the

CLASSIFIED MARKETPLACE

each week. Call for advertising information:

(800) 343-6474
(In MA., 508-879-0700)

Graphics/Desktop Publishing

PC SCREEN TO BIG SCREEN

Look to BOXLIGHT for the Largest Selection of LCD Pads

TRUE COLOR SYSTEMS from $4995
MONOCHROME SYSTEMS from $599

Solutions for VGA, EGA, CGA
All Macs, DEC VT 100s, 220s
IBM Terminals and More

BOXLIGHT™ CORPORATION

VISA, M/C, AMEX, COD
206/697-4008

Computer-Based Presentation Systems Since 1984

Software

FREE BUYER'S GUIDE

When you need programmer's development tools, Programmer's Connection is your best one-stop source. We are an independent dealer representing more than 400 manufacturers with over 1200 software products for IBM personal computers and compatibles including: COBOL compilers and utilities, relational databases, and much more. Call today to receive a **FREE** comprehensive Buyer's Guide, and find out why Programmer's Connection is your best connection for software tools.

Programmer's Connection
7249 Whipple Ave NW
North Canton, Ohio 44720

US 800-336-1166
Canada 800-225-1166
International . . . 216-494-3781
FAX 216-494-5260

It's the

CLASSIFIED MARKETPLACE

Reach Computer Professionals Where They Shop For:

☐ Buy/Sell/Lease
☐ Hardware
☐ Software
☐ Peripherals/Supplies
☐ Communications
☐ Graphics/Desktop Publishing
☐ Time/Services
☐ Bids/Proposals/Real Estate
☐ Business Opportunities

CALL NOW

(800) 343-6474
(In MA., 508/879-0700).

Peripherals/Supplies

Eliminate Costly Computer Repairs

COMPU KIT

Only $10^{95}

Computer Cleaning Kit Includes:
- 2 Bottles Spray Cleaner
- 1 Pkg. Absorbent Wipes
- 1 Pkg. Keyboard Swabs
- 1 Keyboard Brush

Send Check or Money Order + $2.50 Shipping/Handling to:
OTC, 81 Hope Ave.
Worcester, MA 01603
or Call: 1-508-752-5690
M/C and VISA Accepted

Computerworld's

Classified Marketplace

needs only 6 days notice to run your ad!

Call:

(800) 343/6474
(in MA: 508/879-0700)

Computerworld's

Classified Marketplace

gives you buyers with extensive purchase influence.

That's because Computerworld's Classified Marketplace reaches MIS/DP professionals who have extensive involvement in volume purchasing. In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in Computerworld's Classified Marketplace!

For more information, call

800/343-6474
(in MA, 508/879-0700).

Time/Services

Outsourcing . . . When Time, Capital And Quality Count

• • • • • • • • • • • ● • • • • • • • • • • •

Litton Computer Services frees you from the day-to-day grind of data center management . . . so you can concentrate on your business.

Cost-effective, fixed-price solution to in-house computing with the resources and expertise necessary to fit your needs.

- ► Multiple Data Centers
- ► Large-Scale Information Systems
- ► Nationwide Network
- ► Remote Facilities Management
- ► Migration Specialist
- ► Operating System Conversions
- ► Integrated Financial Systems
- ► Major third Party Software Packages

Contain your costs without losing control . . .
CALL 1 800 PLAN LCS.
(1 800 752-6527)

Litton
Computer Services

ICOTECH

MVS/XA
TSO/ISPF/SDSF
CICS
ADABAS
LIBRARIAN

VTAM
FILE-AID
INTERTEST
SAS
$AVRS

DB2
SIMWARE
ACF2
ADC2

- 24 hour availability
- International access
- Superior technical support staff
- Uninterrupted Power Supply
- Certified on-site vault
- Disaster recovery
- Impeccable service

Call Now - Solve Your Computing Worries

TODAY & TOMORROW!

(201) 685-3400

OUTSOURCING AND REMOTE COMPUTING

- IBM MVS/XA Environment
- DB2, IDMS/R, Model 204 and 4GLs
- Professional Support Staff
- Experienced Migration Management Team
- Simplified Pricing and Invoicing
- AS/400
- Full Supporting Services
  - Media Conversion
  - Laser & Impact Print Facility
  - Application Programming
- Technical Support
- 24 Hours a Day – 7 Days a Week

May & Speh, inc.

1501 Opus Place, Downers Grove, IL 60515-5713
1(800) 729-1501
For More Information Contact: Tony Ranieri

ON-LINE WITH COMPUSOURCE

- Multiple centers
- RACF, CICS, IMS
- Volume & term discounts
- Full technical support
- Disaster recovery services
- MVS/XA, VM, DOS
- SAS, DB2
- Worldwide access
- Laser printing

COMPUSOURCE

(919) 469-3325

COMPUTERWORLDS's
CLASSIFIED MARKETPLACE
Examines the issues while Computer Professionals examine your message.
Call for all the details.
(800) 343-6474
(In MA., 508/879-0700)

NEW & USED RAISED FLOORING

Immediate Delivery

Quality Installation

Raised Computer Floors
One Charles Street
Westwood, NJ 07675

(201) 666-8200
FAX (201) 666-3743

Computerworld's

Classified Marketplace

showcases your ad by product category!

Whether it's used equipment, software, time, services or just about any other category of computer product or service, *Computerworld's* Classified Marketplace is organized to make your ad visible and to make buying your product easy.

Just look!

Computerworld's Classified Marketplace Product Categories

software

hardware

conversions

time/services

buy/sell/lease

communications

bids/proposals/
real estate

graphics/desktop
publishing

peripherals/supplies

business opportunities

So if you're selling computer products or services, advertise in the newspaper that showcases YOUR product or service. Advertise in *Computerworld's* Classified Marketplace!

For more information, call

800/343-6474
(in MA, 508/879-0700)

Time/Services

MAKING INCOMPATIBLE DATA, COMPATIBLE!

"You might say, they have redefined the delimits of file conversion!"
MacWorld 9/88

An inexpensive solution to your "intersystem" data conversion/translation requirements:

➤ SOURCE/DESTINATION HARDWARE:
Mainframes, Minis, Super Micros, Micros, Dedicated Word Processors and Typesetters.

➤ SOURCE/DESTINATION SOFTWARE:
Word Processing, DBMS, Spreadsheet, Statistics, Accounting & G/L, Typesetting/Publishing and more.

➤ SOURCE/DESTINATION MEDIA:
Disks, tapes, mag cards and punched cards.

COMPUDATA TRANSLATORS, INC.
3325 Wilshire Blvd., Suite 1202
Los Angeles, CA 90010
(213)387-4477
(800)825-8251

Quality Outsourcing

We Match Any Reasonable Offer

- IBM Mainframe/Peripherals
- Full Technical Support
- 24 hour Help Desk w/ 800#
- Database Conversions
- Automated Print Distribution
- S/38 Disaster Recovery
- Consulting Services
- Network Specialists
- Capacity Planning
- Automated Operations
- Laser Printing

Resources Available Include:

MVS/XA, VM/XA, CMS, CICS, DB2/QMF, TSO/E, ISPF/PDF, SAS, Librarian, IBM IN, PANVALET, EASYTREIVE, Telenet/Tymnet, TOP SECRET

ITAC **Call: (201) 216-3216**
INFORMATION TECHNOLOGY ALLIANCE CORPORATION

COST-EFFECTIVE COMPUTING SERVICES for TODAY and.... TOMORROW

COMDISCO COMPUTING SERVICES CORP.

Provides you with:

REMOTE COMPUTING
COMPUTER OUTSOURCING
FACILITY MANAGEMENT

Featuring:

- IBM® CPUs and Peripherals
- Systems Software: MVS/XA, TSO/E, ISPF/PDF, CICS, VM/XA, VM/SP, HPO, CMS
- Application Software: Database Management Application Development 4/GLs Graphics Statistical Analysis
- Multiple Communications Methods
- Technical Support
- Automated Tape Handling
- ULTRA-Secure Data Center
- Advanced Laser Printing
- Pricing to fit your needs

Call: Robert Marino
201-896-3011
COMDISCO

COMDISCO COMPUTING SERVICES CORP.
430 Gotham Parkway, Carlstadt, NJ 07072

Computerworld's

Classified Marketplace

gives you reach to over 612,000 potential buyers!

And this audience is even verified by the Audit Bureau of Circulations in the only independently audited pass-along survey of its kind. What's more *Computerworld's* Classified Marketplace penetrates buying companies in all major industries. That's because *Computerworld's* total audience blankets key vertical markets that are major users -- and major buyers -- of computer products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers over 612,000 potential buyers. Advertise in *Computerworld's* Classified Marketplace!

For more information, call:

800/ 343-6474
(in MA, 508/879-0700)

REMOTE COMPUTING OUTSOURCING

- MVS/XA
- CICS
- DB2
- VM/370
- TSO
- IMS/DBDC
- DOS/VSE
- CMS

OVER 150 SOFTWARE PRODUCTS

- DEVELOPMENT
- PRODUCTIVITY
- DEBUGGING
- PERFORMANCE

- TELENET
- SEARSNET
- TYMNET
- IBM INFORMATION NETWORK

EXTRAORDINARY CUSTOMER SERVICE
MIGRATION MANAGEMENT

GIS INFORMATION SYSTEMS, INC
815 Commerce Drive, Oak Brook, IL 60521

708-574-3636
New England
617-595-8000

SUNGARD

COMPUTER SERVICES

. OUTSOURCING EXPERTISE

. FIXED PRICE COMPUTING

. ECONOMICAL PRICES - SIGNIFICANTLY LESS THAN IN-HOUSE

.IBM 3090 COMPUTERS WITH MVS/ESA, AND VM TECHNOLOGY

. EXTENSIVE NATIONWIDE TELCOM NETWORK

. EXTENSIVE LIBRARY OF THIRD PARTY SOFTWARE

. PROFESSIONAL SERVICES FOR APPLICATION SUPPORT & DEVELOPMENT

FOR MORE INFORMATION CALL:
(800) 441-4203 (215) 387-3890
(212) 943-9540

SUNGARD COMPUTER SERVICES INC.
1285 DRUMMERS LANE
WAYNE, PA 19086

OUTSOURCING-PROCESSING SERVICES

MVS/TSO · VSE · VM/CMS · CICS · ISPF · VTAM
SQL · DB2 · QMF · SAS · Laser Printing

· Top Management Involvement With Every Account
· Low Cost Provider In Los Angeles

PYRAMID

call: Stan Feinstein, Exec. V.P.
800-899-5178
Pyramid Information Services, Inc.

CORPORATE DISK COMPANY ™

CD TECHNOLOGIES INC • CD MARKETING INC

TAPE AND DISKETTE DUPLICATION

"THE *ONE STOP SHOP* FOR SOFTWARE DEVELOPERS"

STOP going to 5 different suppliers! It can all be done with one easy phone call.

Our Services Include:

- Special Silk Screening Process for 3 1/2" and 5 1/4" Diskettes. We can print right on the shutter of each 3 1/2" disk or right on the jacket of 5 1/4" disks!!
- **Printed Diskette Sleeves**
- **Printed Diskette Labels**
- Printed Binders & Slipcases
- Printed Documentation Pages
- Duplication Equipment
- Low Cost Diskettes

"You have to make but one phone call to the Corporate Disk Company and can consider the job done."

In Illinois (708) 439-DISK
Nationwide 1 (800) 634-DISK

© 1989 by CD Marketing Inc.

Let Us Be Your Data Center

Get high-quality computing service that can make a difference to your bottom line. From MCN Computer Services.

State of the art IBM Compatibility:

MVS-ESA

VM/XA	CICS	DB2
TSO·E	IMS	QMF
ROSCOE	IDMS/R	PROFS

Programmer Productivity Aids:

FILE-AID	ABEND-AID
CICS PLAYBACK	CICS ABEND-AID
dBUG-AID	

We provide state-of-the-art systems, software and security for major clients across the country. And we deliver high-quality, cost-effective services that include:

- Operations 7 days a week 24 hours a day
- Network Management

For more information, call Lisa Walker at:
1-800-521-0444

MCN
Computer Services, Inc.

5225 Auto Club Drive
Dearborn, MI 48126

Go Shopping in...
Computerworld's
CLASSIFIED MARKETPLACE
Call for all the details
(800) 343-6474
(In MA., (508) 879-0700)

VAX SERVICES

- **TRAINING, INSTALLATION, SALES AND SUPPORT**
  - Wordperfect 5.0 for VAX/VMS
  - Wordperfect "Office" for VAX/VMS
  - Wordperfect PlanPerfect for VAX/VMS
  - Wordperfect All-In-One Integration
  - Wordperfect upgrade 4.2 to 5.0
  - VMS System Management
  - VMS Installation
- **EXPERTS IN:**
  - Office Automation/Feasibility Studies
  - Document Management Systems
  - VAX/VMS, Novell
  - Networking, VAX - PC Connectivity
- **INSTALLATION**
- **SOFTWARE DEVELOPMENT**
- **DATA CONVERSION**
- **HARDWARE MAINTENANCE**
- **DATA WIRING**
  (Unshielded Twisted Pair, Thin Wire, ETC.)
- **TIMESHARING**
- **SITE SUPPORT/OUTSOURCING**
- **EXECUTIVE PLACEMENT**

Omnicomputer, Inc
1440 Broadway
New York, NY 10018
Tel. (212) 944-9230
Fax. (212) 869-2846

Your used computer equipment deserves a second chance.

If you have used computer equipment to sell, *Computerworld's* Classified Marketplace is the best place to do your selling. That's because the Classified Marketplace features a Buy/Sell/Lease section to help you market your equipment to the very people who are looking to buy.

And when you advertise in *Computerworld* Classified Marketplace, you reach a total (ABC-audited) audience of over 612,000 computer professionals who turn to *Computerworld* for news, information, features - and the Classified Marketplace - every week.

So give your used computer equipment a second chance today.

To reserve your space, call:

800/343-6474
(in MA, 508/879-0700)

When IS puts on a training hat

For strategy or excess capacity, systems groups are selling education

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

Where do information systems organizations buy training?

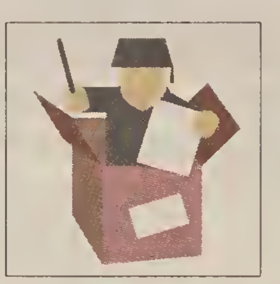
More and more, one answer is from other IS organizations. Rather than functioning only as cost centers, these IS groups are capitalizing on their skills by generating revenue through the sale of training services.

The IS groups market training that spans numerous categories of hardware and software and usually accompanies offerings of other products and services, such as software or information processing.

Weyerhaeuser Co., the Tacoma, Wash.-based wood products supplier, is one company in an industry not typically regarded as high-tech that is pursuing this strategy. Weyerhaeuser's IS division offers personal computer training as well as a line of manufacturing software products.

A number of the newest entrants are large data center operations offering training in DB2, IBM's mainframe relational database management system. Texas Instruments, Inc. and American Airlines both offer DB2 training to outside IS organizations when they have space available in their in-house training classes.

FMC Corp.'s Dallas data center is taking a more aggressive approach. External DB2 training is one of the primary services the center offers. FMC also sells remote processing services to other IS organizations.



While the income from DB2 training accounts for less than 10% of the data center's external revenue, the service increases the likelihood that other IS organizations will sign up for processing services, says John Lozier, manager of product and services development at FMC. Frequently, smaller firms that farm out processing still want programmers up to speed on the latest technology.

FMC's decision to sell training services was sparked by an early investment in the technology. "We got into DB2 back when we probably shouldn't have, in late 1985," Lozier says.

In the early days, DB2 was slow to be accepted by IS organizations because of its sluggish performance, but IBM has continued to improve the product over the years, and it is now the best-selling mainframe DBMS.

Prior to offering DB2 training externally early in 1988, FMC developed an extensive internal program, assisting divisional IS groups with new applications. The data center's DB2 operation serves more than 350 end users.

"The strategy we followed was to start with a small project, because if it failed, it was no big deal," Lozier says. "Once we acquired some skill, we went on to larger projects."

FMC, for example, developed an application that tracks materials for the U.S. Army's Bradley fighting vehicle — one of the company's products.

FMC's largest client is J.C. Penney Co. Other clients include American Express Co., Kimberly-Clark Corp., the Federal Reserve Bank of Dallas and U.S. Sprint Communications Co.

Kimberly-Clark's IS organization has sent three groups of developers and project managers to FMC's classes. The company chose the program because of the structure, which compresses information into short sessions, and the balance between lectures and lab work, says Robert Austin, manager of product services at Kimberly-Clark Computer Services in Irving, Texas.

Between 30% and 40% of the classes involved hands-on applications work, he adds. Kimberly-Clark usually sends between eight and 12 professionals to a class, which allows them to direct the training toward topics of particular interest.

Lozier advises managers at other IS organizations who are considering the sale of training services to focus on three areas.

One of them is ensuring that trainers possess both technical and instructional skills. Stretching the ability of a professional trainer to cover technical issues, particularly the intricacies of DB2, will lead to unproductive sessions, Lozier says. On the other hand, placing a technical DB2 expert into a training role will limit the class to that professional's approach to application development. This inflexibility will also drag down the quality of the session.

Trainers should have both hands-on application experience and time in the classroom; FMC's instructors work on internal development projects and attend outside classes.

The second suggestion is to keep the sessions concise and focused. Avoid redundant subject matter, and do away with unnecessary breaks, although some breaks are required. In addition, the sessions should focus on a single operating environment, although they should not be tied to specific development products.

Finally, secure support from top management. Stress the value of the training for keeping your own people up to date and engaged in their work. "Management wants to keep these sophisticated professionals stimulated and having them work with advanced technology will accomplish that," Lozier says.

Sullivan-Trainor is a *Computerworld* senior editor, features.

Help yourself for a change!

The Software Support Professionals Association (SSPA) is presenting a series of courses in customer and technical support at all levels. You can help yourself with subjects including call management, career planning, reporting, recruiting and managing software support... at a profit.

Managing Software Support

"Basic training" for software support managers and key technical staff involved in customer service and help desk activities. In a hands-on environment, you learn all the essentials to handle incoming calls effectively. It is especially valuable for new managers who are building or expanding a service and support operation. You learn all the key issues from staffing and call management technology to acknowledging customer needs and interacting with other departments you depend on for help and solutions. Plus you learn the pitfalls to avoid.

4 days, July 16-19, Oct. 22-25, Nov. 12-15
$1450 (members $1145)

Call 619/745-2271 today to register.

SSPA
11828 Rancho Bemardo Rd.
Bldg 123-161, San Diego, CA 92128
The Software Support Professionals Association

• *Video Textbook Training* • *Video Textbook Training* •

The Ultimate Training Solution

40 to 60 hours of in-depth training per course. Lessons consist of objectives, lectures, examples with detailed explanations, exercises with the presentation of multiple solutions per problem and lesson reviews. Developed by professionals that have taught these courses to thousands of students. Courses currently available include:

- **The UNIX Operating System, Utilities and Bourne Shell Programming**
- **The UNIX Operating System, Utilities and C Shell Programming**
- **The ANSI C Programming Language and Libraries**
- **Programming with QUICK C**
- **Programming with TURBO C**
- **INFORMIX/SQL Applications Development**
- **INFORMIX/4GL Applications Development**
- **Programming with ADA**
- **Programming with C-scape**

Designed to be your personal video textbook, the price of each course is an affordable $150, plus applicable sales tax. Check, VISA and MasterCard accepted.

Video Textbook Training
200 Lakeside Drive, Building A4
Morgantown, WV 26505
(304) 292-0917 FAX (304) 296-4032

UNIX is a registered trademark of AT&T
INFORMIX/SQL and 4GL are registered trademarks of INFORMIX Software, Inc
QUICK C is a registered trademark of Microsoft Corporation
TURBO C is a registered trademark of Borland International
C-scape is a registered trademark of Oakland Group, Inc

COMPUTERWORLD's

July

Training Editorial Topics

9 **Teaching IS about corporate culture.**
Executive Report:
Turning Advanced Technology to real advantage
Ad Close: July 3

16 **Training Cobol programmers for transition to another language.**
Product Spotlight:
Executive Information Systems
Ad Close: July 10

23 **The return on investment for training**
Executive Report:
Adjusting to the Job of Strategist
Ad Close: July 17

CUSTOM IN-HOUSE TRAINING

o DB/2 o SQL o CICS o VSAM o DL/I
o VSAM Tuning o MVS/XA/ESA o Operations
o Data Communications o Local Area Networks
o DOS/VSE o TSO/ISPF o COBOL o JCL

Increase the productivity of your staff with Practical, Proven, On-site Training Systems !

Jeff Markiewicz & Associates
"Data & Communication Specialist"

For Course Information Call (301) 282-8799

SQL TRAINING
LOGICAL DATABASE DESIGN

Computer Based Training
for DB2 and ORACLE

Call 800-333-1601 or 617-262-4933
for Free catalog and demo diskette

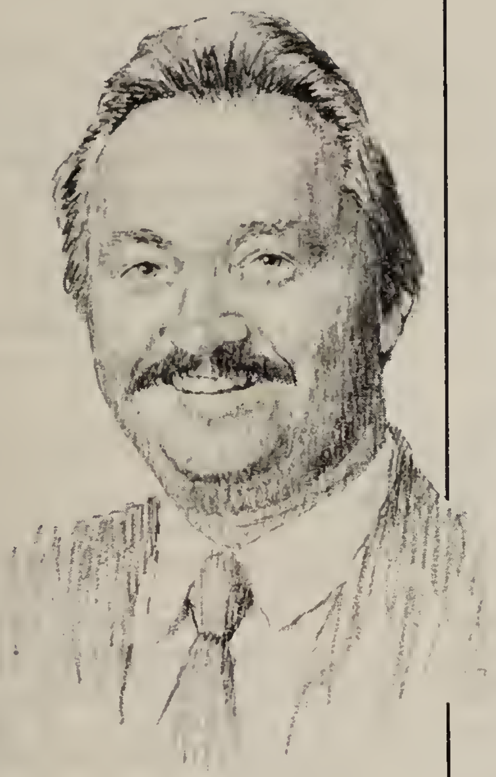
Relational Courseware, Inc.
The Prudential Tower, Suite 200
Boston, MA 02199

Instructor-Led Mainframe Training and Development for IBM and related products.

interact
INFORMATION SERVICES, INC

914-332-6100
(Within NYS)

800-628-5471
(Outside NYS)



"From now on, Computerworld's Direct Response Cards will be an integral piece of our marketing strategy."

— John F. Bonney
Director, Education Services
Hitachi Data Systems

"We're in a highly competitive business," says John F. Bonney, Director, Education Services at Hitachi Data Systems. "In addition to the major players in the IBM-compatible mainframe training world," he adds, "there are dozens of smaller vendors with good name recognition. In order to be a standout in this industry, great service and excellent reputation are simply not enough. We need to keep our name, our product offerings and our class schedule in front of our current and potential customers constantly."

The education services division of Hitachi owes much of its success to direct mail advertising. When customers enroll in mainframe operating systems courses, chances are that they first heard about the courses through the mail.

So when the suggestion to purchase card deck advertising came up, John needed hard facts to convince him to divert funds from this highly successful direct mail effort. *Computerworld* supplied the statistics, then persuaded him to try card packs just once.

"In September, John remarks, we were still receiving responses from the June card deck." Nearly 400 replies later, he's convinced that marrying Hitachi's well respected technical training with *Computerworld*'s proven card deck advertising brings positive results. He adds, "From now on, *Computerworld*'s Direct Response Cards will be an integral piece of our marketing strategy."

Computerworld Direct Response Cards give you a cost-effective way to reach *Computerworld*'s powerful buying audience of over 135,000 computer professionals. They're working for Hitachi's education services division — and they can work for you. Call Norma Tamburrino, National Account Manager, *Computerworld* Direct Response Cards, at (201) 587-0090 to reserve your space today.

COMPUTERWORLD
INSIDE
They're here! AS/400s aired
COMPUTERWORLD
AUGUST RESPONSE CARDS
J. Milton
MIS Director
XYZ Future Technology, Inc.
Anytown, USA
INSIDE
The computer products & services you need!

COMPUTERWORLD
DIRECT RESPONSE CARDS

……

SALES OFFICES

Publisher/Fritz Landmann

Senior Vice-President/National Sales Director/Kevin Harold, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

BOSTON: Regional Vice-President - North/David Peterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Longley, Lisa Bonaccorso, Linda Clinton, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

CHICAGO: Regional Vice-President - Midwest/Kevin McPherson, Senior District Manager/Larry Craven, Sales Assistants/Kathy Sullivant, Karol Lange, **COMPUTERWORLD**, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (708) 827-4433

NEW YORK: Regional Vice-President - East/Bernie Hockswender, District Managers/Fred LoSapio, Paula D'Amico, Sales Assistants/Susan Kusnic, Patricia DeBiase, **COMPUTERWORLD**, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

LOS ANGELES: Regional Vice-President - West/Jan Harper, Southwestern Regional Manager/Carolyn Knox. Sales Assistant/Bev Raus, **COMPUTERWORLD**, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Regional Vice-President - West/Jan Harper, Senior District Managers/Ernie Chamberlain, Michela O'Connor Abrams, District Manager/Alicia Sariballs, Sales Assistants/Chris Kobayashi, Nurit Zekman, Carol Lacasse **COMPUTERWORLD**, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Regional Vice-President - East/Bernie Hockswender, District Manager/Melissa Christie Neighbors, Sales Assistant/Debra Brown, **COMPUTERWORLD**, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Regional Vice-President - Midwest/Kevin McPherson, Southeastern District Manager/Darren Ford, Sales Assistant/Brenda Shipman, **COMPUTERWORLD**, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Regional Vice-President - East/Bernie Hockswender, District Manager/Paula D'Amico, **COMPUTERWORLD**, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 967-1350

CLASSIFIED ADVERTISING SALES:
Classified Advertising Director/John Corrigan, Marketing Director/Derek E. Hulitzky, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

PRODUCT CLASSIFIED ADVERTISING:
East: Account Manager/Paul Bonarrigo, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

West: Account Executive/Bill Creonte, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES:
New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700, Account Executive/Andrew Rowe, (800) 343-6474, In MA (508) 879-0700

Mid-Atlantic: Regional Manager/Valerie Galbo, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 967-1350, Sr. Account Executive/Jay Novack, (800) 343-6474

South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, O'Hare Corp. Twr 1, 10400 W. Higgins Rd., Ste. 300, Rosemont, IL 60018 (708) 827-4433, Account Executive/Ellen Casey (800) 343-6474

West: Regional Manager/Barbara Murphy, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164, Account Executive/Christopher Glenn (800) 343-6474

DIRECT RESPONSE CARDS:
East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

West: Account Executive/Jill Halbert, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164

IDG INTERNATIONAL MARKETING SERVICES:
Managing Director/Frank Cutitta, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

West Coast Marketing Manager/Leslie Barner, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

……

CW PUBLISHING/INC.

An International Data Group Company

Fritz Landmann
President & Publisher

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 508-879-0700, Telex: 95-1153, FAX: 508-872-8564

Val Landi
Senior Vice-President
Special Publications Division

Kevin Harold
Senior Vice-President
National Sales Director

Matthew Smith
Senior Vice-President
Chief Financial Officer

FINANCE **Controller**, Mark Sullivan.
SALES **Advertising Director**, Carolyn Novack. **Classified Advertising Director**, John Corrigan.
Marketing Director, Derek E. Hulitzky.
Display Advertising Production Manager, Maureen Hanley. **Classified Operations Manager**, Cynthia Delany.
MARKETING **Vice President/Business Development**, Jan Harper. **Manager, Marketing Communications**, Mary Doyle.
Account Manager, Marketing Communications, Elizabeth Phillips. **Manager, Trade Show & Conventions**, Audrey Shohan.
CIRCULATION **Director of Circulation Management**, Maureen Burke. **Director of Circulation Promotion**, Carol Spach.
PRODUCTION **Vice President/Manufacturing**, Leigh Hometh. **Director of Publishing Technology**, Carol Polack.
Production Manager, Beverly Wolff.
PUBLISHER'S OFFICE **Assistant to the President**, Karen Eliott. **Assistant to the Senior Vice-President**, Libby Levinson.

……

GLOBAL LEADERSHIP NETWORK

FOREIGN EDITORIAL/SALES OFFICES

ARGENTINA: Ruben Argento, CW Communicaciones S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

ASIA: S.W. Chan, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong, Phone: (011) 852 5 861 3238. FAX: (011) 852 5 86 10953.

AUSTRALIA: Alan Power, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR). FAX: (011) 61 2 439 5512.

AUSTRIA: Manfred Weiss, CW Publikationen Verlags Ges.m.b.H., Zieglergasse 6, A-1070 Wien, Austria. Phone: (011) 43-222-93-16-31-0. Telex: (847) 115542 (SCH/A) FAX: (011) 43 222 93 05 08 33.

BRAZIL: Ney Kruel, Computerworld do Brazil Ltda, Praca Floriano, 19/26 Andar, 2031 Rio de Janiero, RJ Brazil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30830 BR. **Sao Paulo:** Computerworld do Brazil Ltda., Rua Joaquim Floriano, 488/3 andar-CEP 04534, Sao Paulo, Brazil, Tel: (011) 55 11 853 8149. Telex: (391) 1132017 (WORD BR).

COLOMBIA: Rodrigo Ruentas, La Nueva Ley, Transv. 428 No. 99 A/66, Apartado 58505, Bogota, D.E. Columbia. Tel: (011) 571 271 5165.

DENMARK: Preben Engell, IDG Danmark A/S, Krujmtappan 4 DK-2500 Valby Denmark. Tel: (011) 45 36 442800. Telex: (855) 31566. FAX: (011) 45 36 442033.

FRANCE: Francois Chaussonniere, IDG Communications S.A., Immeuble La Fayette, 2, Place des Vosges, Cedex 65, 92051 Paris la Defense, France. Tel: (011) 33 1 4904 7900. Telex: (842) 613234F. FAX: (011) 33 1 4904 7800.

HUNGARY: Dezso Futasz, Computerworld Informatika Co., Kft. Pf. 386, 1536 Budapest, Hungary, Phone: (011) 3611 228 458. Telex: (861) 225307 (KSHP H). FAX: (011) 3611 423 965.

INDIA: Michael Sales, Media Transasia India Ltd., 102 Anand Lok, New Delhi 110049, India. Tel: (011) 91 11 644 0110. FAX: (011) 91 11 643 2950.

ITALY: Umberto Costamagna, Computer Publishing Group CPG, Via Vida 7, 20127 Milano, Italy. Phone: (011) 39-2-2613432. Telex: (843) 335318. FAX: (011) 39 2 284 0737.

JAPAN: Jim Povec, IDG Communications/Japan, Kioicho TBR Bldg., 5-7 Kojimachi, Chiyodaku Tokyo 102, Japan. Tel: (011) 81 3 222 6411. Telex: (781) 252 4217. FAX: (011) 81 3 222 6566.

MEXICO: Henry Morales, Computerworld Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Tel: (011) 52 5 514 4218 or 6309. Telex: (383) 177 1300 (ACHAME). FAX: (011) 525 511 4860.

THE NETHERLANDS: Wout Berends, IDG Communications B.V., de Paulus Potterstraat 18, 1071 DA Amsterdam, The Netherlands. Tel: (011) 31 20 664 6426/664 5818. Telex: (844) 18242 (CWCOM NL). FAX: (011) 3120 796 006.

NEW ZEALAND: Martin Taylor, IDG Communications Ltd., 2nd Floor, 15 Augustus Terrace, Parnell, Auckland 1, New Zealand. Phone: (011) 64-9-779-902. Fax: (011) 64 9 774 604.

NORWAY: Morten Hansen, CW Norge A/S, Hovinvelen 43, 0576, Oslo 5, Norway. Phone: (011) 472 647725. Telex: (856) 76476 (CW NOR N). FAX: (011) 47 268 0152.

PEOPLE'S REPUBLIC OF CHINA: Shen Yao, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Tel: (011) 861 81 0044. Telex: (716) 222214 (CCW CN).

SINGAPORE: Asia Computerworld Communications, 04-07 Parkway Builders Centre, No.1 Marine Parade Central, Singapore 1544, Republic of China. Phone: (011) 65 345 8383. Telex: (786) RS 37003 (Comwor). FAX: (011) 65 345 7097.

SOUTH KOREA: Young S. Gimm, Hi Tech Information, Inc. 3rd floor, Youngjaa Building, 1600-7 Seocho 3 Dong, Seochogu, Seoul 137-073 Korea. Tel: (011) 82 2 588 8922. FAX: (011) 82 2 582 9823.

SPAIN: Paco Zabala, CW Communications, S.A., Rafael Celvo, 18, 48, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 45522 (CW E). FAX: (011) 34 1 419 6104.

SWEDEN: Bengt Marnfeldt, CW Communications AB, Sodra Hamnvagan 22, S-115 41 Stockholm, Sweden. Tel: (011) 46 8667 9180. Telex: (854) 14904 9 (NOVACW). FAX: (011) 46 8665 3132.

SWITZERLAND: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 1077. Telex: (845) 816 710 (CWCI CH). FAX: (011) 41 1 55 1135.

TAIWAN: David Chu, IDG Communications/Taiwan, 4F-2, No. 137, Fu Hsin South Road, Sec. 1 Taipei, Taiwan, Phone: (011) 886 2 776 4553. Telex: (785) 14142 (ACE-GROUP). FAX: (011) 886 2 721 6444.

LONDON: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom. Phone: (011) 44 1 831 9252. Telex: (851) 262346. FAX: (011) 44 1 405 2347.

UNITED KINGDOM: Colin Smith, Oliver Smith & Partners, 18 Abbeville Mews, 88 Clapham Park Road, London SW4 7BX, United Kingdom. Phone: (011) 44-1-978-1440. FAX: (011) 44-1-978-1550.

VENEZUELA: Kalman von Vajna Nagy, IDG Comunicaciones C.A., Torra Maracaibo, Piso 10, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30. FAX: (011) 58 2 724970.

WEST GERMANY: Eckhard Utpadel, IDG Communications Verlag AG, Rheinstrasse 26/86, Postfach 40 04 29, 8000 Munich 40, West Germany. Phone: (011) 49 89 360860. Telex: (851) 5215350. (COMW D). FAX: (011) 49 89 3 60 86257.

……

INTERNATIONAL DATA GROUP, INC.

Patrick J. McGovern
Board Chairman

Axel Leblois
Vice-Chairman

Walter Boyd
President

William P. Murphy
Vice President/Finance

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information. International Data Group publishes over 130 computer publications in more than 40 countries. Nineteen million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S *Computerworld Argentina;* ASIA'S *Asian Computerworld;* AUSTRALIA'S *Computerworld Australia, PC World, Macworld;* AUSTRIA'S *Computerwelt Oesterreich;* BRAZIL'S *DataNews, PC Mundo;* CANADA'S *ComputerData;* CHILE'S *Informatica, Computacion Personal;* COLUMBIA'S *Computerworld Columbia;* DENMARK'S *CAD/CAM WORLD, Computerworld Danmark, PC World, Macworld, Unix World;* FINLAND'S *Mikro PC, Tietoviikko;* FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Telecoms International;* HUNGARY'S *Computerworld SZT, Mikrovilag;* INDIA'S *Computers & Communications;* ISRAEL'S *People & Computers;* ITALY'S *Computerworld Italia, PC World Italia;* JAPAN'S *Computerworld Japan, Infoworld, Publish;* KOREA'S *Hi-Tech Information/Computerworld;* MEXICO'S *Computerworld Mexico, PC Journal;* THE NETHERLAND'S *Computerworld Netherlands, PC World, Amiga World;* NEW ZEALAND'S *Computerworld New Zealand, PC World New Zealand;* NIGERIA'S *PC World Africa;* NORWAY'S *Computerworld Norge, PC World Norge CAD/CAM, Macworld Norge;* PEOPLE'S REPUBLIC OF CHINA *China Computerworld, China Computerworld Monthly;* POLAND'S *Computers;* SPAIN'S *CIM World, Communicaciones World, Computerworld Espana, PC World, Amiga World;* SWEDEN'S *Computer Sweden, PC/Nyhetherna, Mikrodatorn, PC World, Macworld;* SWITZERLAND'S *Computerworld Schweiz;* TAIWAN'S *Computerworld Taiwan, PC World;* UNITED KINGDOM'S *Graduate Computerworld, PC Business World, ICL Today, Lotus UK, Macworld U.K.;* UNITED STATES' *Amiga World, CIO, Computerworld, Digital News, Federal Computer Week, GamePro, InCider, InfoWorld, International Custom Publishing, Macworld, Network World, PC Games, PC World, Portable Computing, PC Resource, Publish!, Run, Sun Tech Journal;* U.S.S.R.'S *PC World U.S.S.R., Manager, PC Express, Network;* VENEZUELA'S *Computerworld Venezuela, Micro Computerworld;* WEST GERMANY'S *Computerwoche, Information Management, PC Woche, PC Welt, Amiga Welt, Macwelt.*

ADVERTISERS INDEX

Adobe Systems	94-95
AT&T	19, 66, 76
B I Moyle Associates, Inc.	27
Bull Worldwide Information Systems	22-23
Businessland	30-31
Butler & Curless	91
Cambex	35
Candle Corp	72, 84-85
Chipcom	50
Cincom Systems	34
Codex	61
Command Technology	57
Comparex	68
Computer Associates	62-63
CW Circulation	86
Data General Corp	40-41
Digital Equipment Corp	16-17, 73-75
Dun & Bradstreet	C4
Eastman Kodak	54
Gupta Technologies	42
Hewlett-Packard	37
Hitachi Data Systems	90
IBM	33, 58-59
Information Builders	15, 21, 64-65
Ingres	96-97
Interface Systems	80
Intergraph	18
ISC-Bunker Ramo	79, 81
Jupiter Technology	14
Legent Corp	10, 92
Lotus Development Corp	51-53, 55
McDonnell Douglas	69
MCI	56
Micro Focus	39
Microgate	38
Microsoft	44-45, 82-83
Motorola Computer Group	48-49
Must Software	29
NETEC International	47
Network Systems	36
Oracle Corp	5, 11, 13
Paragon Software International	12
Ross Systems	93
SAS Institute	46-47
Software AG	26
Software Engineering of America	9
Software Spectrum	60
Spectragraphics	78
Sterling Software	28
Syncsort	3
System Center Software	7
TLM	38
Transform Logic	70-71
Unix International	89
Wang	C3
Wyse Technology	46
XDB Systems	43

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Have A Problem With Your Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:

COMPUTERWORLD, P.O. Box 2043,
Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Name
Title
Address
City
Company
State
Zip

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Please allow six weeks for processing time.

Your New Address Goes Here

Name
Company
Address
City State Zip
Address shown: ☐ Home ☐ Business

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available:

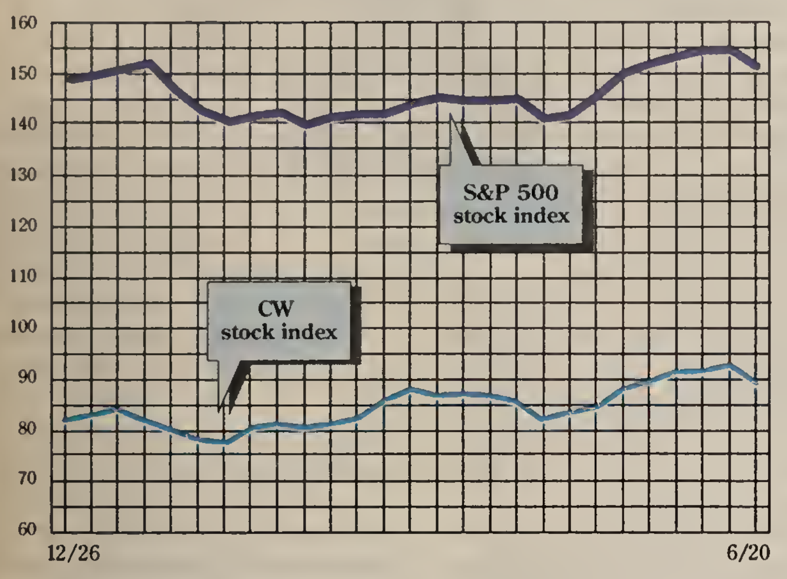
1-800-669-1002

Outside U.S. call: (614) 382-3322

COMPUTERWORLD

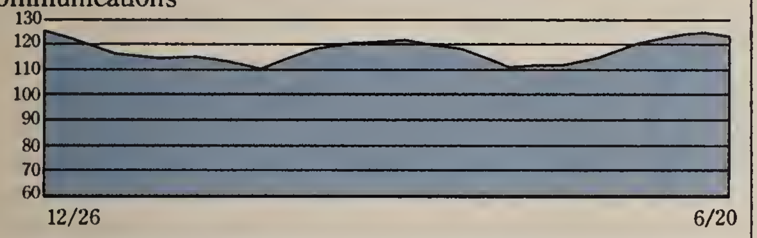
P.O. Box 2043, Marion, Ohio 43305

STOCK TRADING INDEX

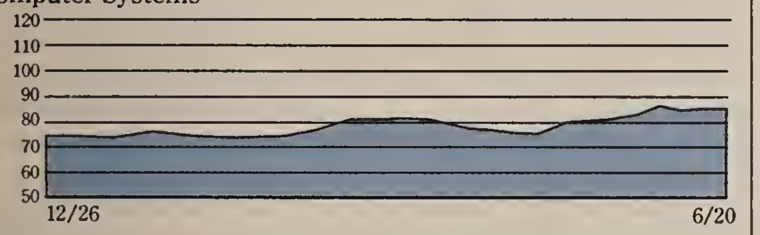


Indexes	*Last Week*	*This Week*
Communications	125.4	**123.2**
Computer Systems	86.4	**86.5**
Software & DP Services	131.7	**128.3**
Semiconductors	63.0	**60.6**
Peripherals & Subsystems	98.6	**95.4**
Leasing Companies	84.0	**80.3**
Composite Index	92.1	**89.8**
S&P 500 Index	154.1	**151.6**

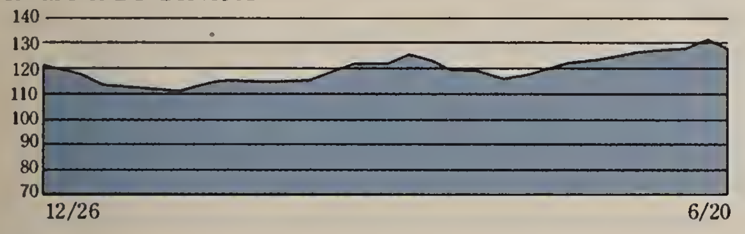
Communications



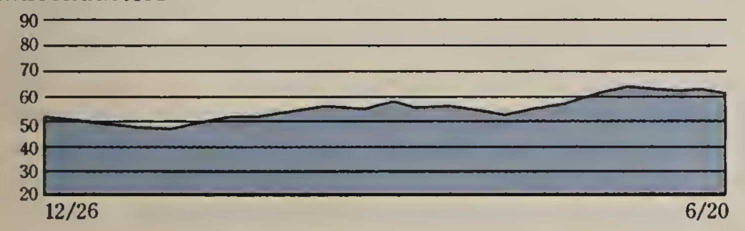
Computer Systems



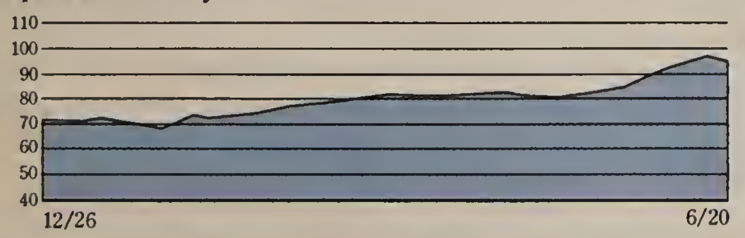
Software & DP Services



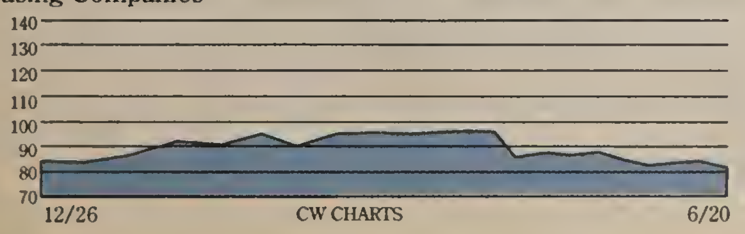
Semiconductors



Peripherals & Subsystems



Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 20, 1990

Communications and Network Services

EXCH		52-WEEK RANGE		PRICE CLOSE JUNE 20, 1990	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	68	55	63.25	-1.8	-2.7
Q	ANOREW CORP	26	20	21.5	-0.5	-2.3
Q	ARTEL COMM CORP	10	5	5	-0.9	-14.9
N	AT&T	47	35	43.125	0.0	0.0
Q	AVANTEK INC	7	2	2.875	0.0	0.0
N	AYOIN CORP	21	13	13.25	-1.3	-8.6
N	8ELL ATLANTIC CORP	57	43	49.875	-2.5	-4.8
N	8ELLSOUTH CORP	59	46	54.25	-2.1	-3.8
Q	COMPRESSION LABS INC	16	7	15.375	0.5	3.4
Q	CONTEL CORP	37	23	27.125	-1.8	-6.1
Q	DATA SWITCH CORP	5	2	3.375	-0.1	-3.6
Q	DIGITAL COMM ASSOC	27	17	23.25	-1.1	-4.6
Q	OYNATECH CORP	21	15	15.25	-0.8	-4.7
Q	FI8RONICS INTNL INC	13	5	12.5	2.1	20.5
Q	GANDALF TECHNOLOGIES	7	2	3.625	0.1	3.6
N	GENERAL DATACOMM INOS	7	3	3.625	-0.5	-12.1
N	GTE CORP	72	52	62.75	-2.0	-3.1
Q	INFOTRON SYS CORP	12	4	3.875	0.1	3.3
N	ITT CORP	65	51	58.875	-0.5	-0.8
N	M A COM INC	9	3	4.875	-0.1	-2.5
Q	MCI COMMUNICATIONS CORP	49	31	41.625	-2.0	-4.6
N	NETWORK EQUIP TECH INC	34	9	10	0.6	6.7
Q	NETWORK SYS CORP	15	7	13.875	-0.9	-5.9
N	NORTHERN TELECOM LTD	30	18	28.375	-0.9	-3.0
Q	NOVELL INC	56	24	55.75	1.5	2.8
N	NYNEX CORP	92	75	85.125	-2.1	-2.4
N	PACIFIC TELESIS GROUP	52	39	44	-1.5	-3.3
A	PENRIL CORP	7	4	6.5	-0.5	-7.1
N	SCIENTIFIC ATLANTA INC	29	18	27.5	0.3	0.9
N	SOUTHWESTERN 8ELL CORP	65	50	55.125	-1.9	-3.3
Q	3 COM CORP	19	10	15.875	0.5	3.3
N	U S WEST INC	41	33	37.875	0.4	1.0

Computer Systems

Q	ALLIANT COMPUTER SYS	9	4	7.813	-0.3	-3.8
Q	ALPHA MICROSYSTEMS	8	3	3.125	-0.3	-7.4
Q	ALTOS COMPUTER SYS	8	5	5.5	0.1	2.3
A	AMDAHL CORP	22	11	15.375	-0.1	-0.8
Q	APPLE COMPUTER INC	50	32	40	0.3	0.6
Q	AST RESH INC	26	7	22.375	-2.1	-8.7
N	BOLT BERANEK & NEWMAN	9	4	4.875	0.0	0.0
N	COMPAQ COMPUTER CORP	130	73	124	-1.3	-1.0
N	COMMODORE INTNL	18	6	7.75	-0.4	-4.6
N	CONTROL DATA CORP	23	16	19.125	-0.4	-1.9
N	CRAY RESH INC	52	31	47.25	-2.1	-4.3
Q	DAISY SYS CORP	5	0	0.125	-0.3	-71.5
N	DATA GEN CORP	19	8	11.25	-0.8	-6.3
N	DATAPOINT CORP	6	2	3	0.0	0.0
Q	DELL COMPUTER CORP	13	5	10.75	-0.4	-3.4
N	DIGITAL EQUIP CORP	103	70	85.75	-2.4	-2.7
N	FLOATING POINT SYS INC	3	0	3	0.8	33.3
N	HARRIS CORP	40	28	35	0.0	0.0
N	HEWLETT PACKARD CO	58	40	48.25	0.0	0.0
N	HONEYWELL INC	103	73	95.25	-4.5	-4.5
N	I8M	122	93	118	-3.4	-2.8
Q	INFORMATION INTL INC	16	12	13	0.5	4.0
Q	IPL SYS INC	14	5	9.75	-0.3	-2.5
N	MAI 8ASIC FOUR INC	7	2	2.25	0.1	5.9
N	MATSUSHITA ELEC INDL LTD	180	123	136.25	-5.0	-3.5
Q	MENTOR GRAPHICS CORP	26	14	21.25	-3.5	-14.1
N	N8I INC	3	0	0.313	0.2	150.4
N	NCR CORP	72	53	65.625	-3.4	-4.9
Q	PYRAMID TECHNOLOGY	36	10	29.75	-2.3	-7.0
Q	SEQUENT COMP SYS INC	34	11	30.5	-3.1	-9.3
Q	SHARE8ASE CORP	3	0	0.407	-0.1	-13.2
Q	SUN MICROSYSTEM INC	34	13	33	-0.4	-1.1
Q	SYMBOLICS INC	2	0	0.5	-0.1	-11.2
N	TANDEM COMPUTERS INC	30	17	22.75	-1.6	-6.7
N	TANDY CORP	49	30	36.375	-0.3	-0.7
N	ULTIMATE CORP	11	5	7.375	0.4	5.4
N	UNISYS CORP	25	12	14.375	-0.5	-3.4
A	WANG LABS INC	8	4	4.375	-0.1	-2.8

Software & DP Services

Q	AMERICAN MGMT SYS INC	17	11	15.625	-0.8	-4.6
Q	AMERICAN SOFTWARE INC	26	14	25	0.0	0.0
N	ANACOMP INC	7	2	2.875	-0.3	-8.0
Q	ANALYSTS INTL CORP	21	14	19.5	-0.8	-3.7
Q	ASHTON TATE	18	9	10.5	-0.8	-6.7
Q	ASK COMPUTER SYS INC	15	7	9	0.0	0.0
N	AUTO DATA PROCESSING	59	39	55.25	-1.5	-2.6
Q	AUTODESK INC	55	33	52.75	0.3	0.5
Q	8MC SOFTWARE INC	30	12	27.25	-1.5	-5.2
N	BUSINESSLANO INC	14	7	8.125	-0.8	-8.5
Q	COGNOS INC	9	4	8.5	-0.4	-4.2
N	COMPUTER ASSOC INTL INC	20	11	15.5	-0.5	-3.1
Q	COMPUTER HORIZONS CORP	16	7	13.5	0.0	0.0
N	COMPUTER SCIENCES CORP	59	40	47.625	0.3	0.5
N	COMPUTER TASK GROUP INC	14	9	11.25	-0.3	-2.2
Q	COMSHARE INC	24	15	21.75	-1.5	-6.5
Q	CORPORATE SOFTWARE	15	8	13.5	-0.8	-5.3
N	GENERAL MTRS (CLS E)	37	24	35.875	-0.1	-0.3
Q	HOGAN SYS INC	7	4	3.625	-0.1	-3.3
Q	INFORMIX CORP	17	8	15	-1.3	-7.7
Q	INTELLICORP INC	7	3	6.875	0.1	1.9
Q	LEGENT CORP	32	19	26.25	-2.5	-8.7
Q	LOTUS DEV CORP	39	21	35	-3.6	-9.4
Q	MICROSOFT CORP	79	26	77.625	1.1	1.5
Q	NATIONAL DATA CORP	35	13	14.5	-1.0	-6.5
N	ON LINE SOFTWARE INTL INC	11	6	7.75	0.0	0.0
Q	ORACLE SYS CORP	28	15	23	2.0	9.5
N	PANSOPHIC SYS INC	19	10	13.625	-0.6	-4.4
Q	PHOENIX TECHNOLOGIES INC	13	2	4.375	-0.5	-10.3
Q	POLICY MGMT SYS CORP	42	28	39.75	-1.3	-3.0
Q	PROGRAMMING & SYS INC	25	16	23.75	1.3	5.6
Q	RELATIONAL TECH INC	11	5	6.125	-0.6	-9.3
N	REYNOLDS & REYNOLDS CO	30	19	22.75	-0.6	-2.7
Q	SAGE SOFTWARE INC	16	7	14.875	-0.3	-1.7
Q	SEI CORP	21	15	20	-0.5	-2.4
Q	SHARED MED SYS CORP	17	12	13.375	0.5	3.9
Q	SOFTWARE PU8G CORP	28	13	25	-1.6	-6.1
N	STERLING SOFTWARE INC	11	7	10	0.0	0.0
Q	SUNGARD DATA SYS INC	26	16	23	-0.5	-2.1
N	SYSTEM CENTER INC	26	17	21.5	-2.5	-10.4
N	SYS. SOFT INC	29	14	25.5	-0.3	-1.0
Q	WORDSTAR	3	1	1.063	0.1	13.3

Semiconductors

N	ADV MICRO DEVICES INC	11	7	9.125	-0.8	-7.6
N	ANALOG DEVICES INC	11	7	7.75	-0.3	-3.1
Q	ANALOGIC CORP	11	8	9.125	0.3	2.8
Q	CHIPS & TECHNOLOGIES INC	26	15	19.75	-0.4	-1.9
Q	INTEL CORP	49	28	47.5	-0.5	-1.0
Q	MICRON TECHNOLOGY INC	23	7	12.875	-1.5	-10.4
N	MOTOROLA INC	88	51	86	-0.6	-0.7
N	NATL SEMICONDUCTOR	9	5	7	-1.0	-12.5
N	TEXAS INSTRS INC	44	28	39.5	-0.4	-0.9
A	WESTERN DIGITAL CORP	15	6	13.75	-0.9	-6.0

Peripherals

Q	ALLOY COMP	2	0	0.813	-0.1	-10.4
N	AM INTL INC	6	2	2.875	0.4	15.0
Q	AUTO TROL TECH CORP	5	2	3.875	-0.5	-11.4
Q	8ANCTEC INC	24	13	20.25	-2.8	-12.0
A	COGNITRONICS CORP	8	3	5.25	-0.4	-6.7
Q	CONNER PERIPHERALS	26	10	25.25	-0.8	-2.9
A	DATARAM CORP	20	8	18.75	0.4	2.0
N	EASTMAN KODAK CO	52	36	41.125	-0.6	-1.5
N	E M C CORP MASS	7	3	5.625	-0.4	-6.3
Q	EMULEX CORP	9	4	6.375	0.8	13.3
Q	EVANS & SUTHERLANO	35	17	27.875	-3.1	-10.1
Q	ICOT CORP	2	1	1.25	0.0	0.0
Q	INTERLEAF INC	9	5	7.5	-0.3	-3.2
Q	IOMEGA CORP	6	3	4.688	0.4	10.3
Q	LEE DATA CORP	4	1	1.375	-0.1	-4.4
Q	MASSTOR SYS CORP	4	1	1.25	-0.1	-9.1
Q	MAXTOR CORP	17	7	14.125	-1.5	-9.6
Q	MICROPOLIS CORP	9	3	7.5	-0.8	-9.1
N	MINNESOTA MNG & MFG CO	88	68	85.5	-0.3	-0.3
Q	PERSONAL COMP PROOUCTS INC	5	4	4.063	-0.2	-4.4
Q	PRINTRONIX INC	15	7	13.125	-0.9	-6.3
N	QMS INC	21	8	19	-1.6	-7.9
Q	QUANTUM CORP	23	9	21.75	0.5	2.4
N	RECOGNITION EQUIP INC	13	4	4.5	-0.4	-7.7
Q	REXON INC	10	6	8.375	-0.3	-2.9
Q	SEAGATE TECHNOLOGY	20	10	14.875	-0.6	-4.0
N	STORAGE TECH CORP	34	9	32	-2.0	-5.9
Q	TANDON CORP	3	0	2.625	-0.1	-4.5
N	TEKTRONIX INC	24	12	14.125	-0.8	-5.0
Q	TELEVIDEO SYS INC	1	0	0.406	-0.1	-13.4
N	XEROX CORP	69	46	48	0.1	0.3

Leasing Companies

N	CAPITAL ASSOC INTNL INC	8	3	3	-0.3	-7.7
N	COMDISCO INC	34	17	17.875	-1.1	-5.9
Q	CONTINENTAL INFO SYS	1	0	0.125	0.0	-11.3
Q	LDI CORPORATION	18	13	15.25	-0.8	-4.7
Q	PHOENIX AMERN INC	5	3	4	0.1	3.2

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

Skinny-dip

Technology firms grow leaner during week of diving profits

Welcome summertime: days of sultry breezes, high-rising thermometers and, apparently, falling technology stocks. Several firms got the cold shoulder from investors last week, including Compaq Computer Corp. After reaching new highs the week before, Compaq lost 4 points last week to end at 124 — and this on the heels of unveiling new laptop and desktop machines.

Traders with selling on their minds sent a chill through other hardware makers as well, including IBM, which dropped 1¼ points to 119⅛. Digital Equipment Corp. fell 1½ points to 85½, while NCR slid 1¾ points to 66. Apple Computer, Inc. was a hot ticket, however, climbing 2⅜ points to 41⅞.

Sentiments ran hot and cold in the ongoing squabble between Motorola, Inc. and Hitachi Ltd. over ownership of the 68030 chip. First, Motorola shares fell slightly after a court ordered the firm to stop selling the chip. That order was stayed later in the week, sending Motorola stock up 1½ points to 88⅛.

Competing semiconductor firms stumbled. Intel Corp. lost 1⅛ points to close at 47⅛, while National Semiconductor Corp. was down ¾ of a point to 6⅞.

In other sectors, Hewlett-Packard Co. brought out a new series of workstations and brought home a ¼-point advance to 47¾. Novell, Inc. reached another new high, adding 1 point to 56¼. Microsoft Corp. also picked up 1 point to close at 77. In the long-distance race, AT&T and MCI Communications Corp. ran virtually dead even all week. By Thursday, though, AT&T had pulled ahead, gaining ⅞ of a point to finish at 43⅝ as MCI gave up 1¼ points to close at 41.

KIM S. NASH

NEWS SHORTS

SQL/DS gets boost

IBM tuned up the performance of SQL/DS, its relational database management system for the VM and VSE mainframe operating systems. SQL/DS Version 3, Release 1, which is scheduled for availability June 29, is said to offer better availability of and access to data. IBM released SQL/DS performance comparisons with the previous release — Version 2, Release 2 — that showed a 33% improvement.

....

Industry turns red into black

In a dramatic turnaround from last year's first-quarter performance, trade-in U.S. computer and telecommunications equipment posted a surplus of $365 million for the first three months of 1990, according to the Computer and Business Equipment Manufacturers Association. A year ago, the industry recorded a $11 million deficit. In business equipment and parts, the deficit worsened from $565 million to $610 million. However, data processing equipment and parts boosted its surplus from $913 million to $995 million.

....

European software sales spiraling

Sales in the European market by U.S. software firms grew 59% for the first quarter, compared with the same period last year, according to the Software Publishers Association (SPA), which said that the European market shows no sign of slowing down. Thirty U.S.-based software firms, including Lotus Development Corp., Microsoft Corp. and Ashton-Tate Corp., participated in a study by submitting sales data to Arthur Andersen & Co., the firm that prepared the report for the SPA.

....

NYSE eyes off-hours trading

The New York Stock Exchange announced plans to implement 24-hour trading at some point in the future. NYSE's chairman, John Phelan, said that the Big Board will begin after-hours trading later this year, add nightly electronic stock auctions sometime after that and eventually will move to around-the-clock trading. NYSE has said in the past that there was no demand for after-hours trading but apparently changed its mind after a study showed that only 68% of transactions in NYSE-listed stocks were conducted on the Big Board.

....

Apple exec steps back

Apple USA Senior Vice-President of Sales William Coldrick has scaled back his responsibilities at Apple Computer, Inc. and will assume a new part-time role as senior vice-president and advisor. Apple executives said that Coldrick, 47, has completed the goals he set when he took the position and will now serve as an advisor on strategic initiatives. Michael Dionne, vice-president of Southwestern operations, will replace Coldrick.

....

Quarterdeck supports Windows

Quarterdeck Office Systems, Inc. announced new releases last week of the Quarterdeck Expanded Memory Manager (QEMM). QEMM 5.1 provides tools for integrating currently installed DOS programs into Microsoft's Windows 3.0 environment. It will allow Windows 3.0 users to load terminate-and-stay-resident programs, device drivers and DOS resources into high memory when running in real, standard or enhanced modes. High memory is memory between 640K and 1M bytes — usually unavailable to DOS.

....

Northern Tel beefs up PBXs

Northern Telecom, Inc. enhanced its private branch exchanges with basic-rate Integrated Services Digital Network (ISDN) capabilities across the entire Meridian 1 product line. It is also providing Meridian 1 connectivity now to AT&T 5ESS central-office switches via an ISDN primary-rate interface (PRI). PRI offers 23 channels for voice and/or data, giving users more control over management elements and access to many more telephone features, since control information flows over PRI's one 64K bit/sec. out-of-band signaling channel.

Defense

FROM PAGE 1

processes themselves. Coupled with recent defense contract slowdowns, this has caused the firm "to curtail our expenditures for the last year on automation equipment," said Ernie Ridenhour, corporate vice-president of information resource management.

At the same time, approximately 10% of the company's 1,800 software applications developers have been let go or reassigned because of redundancies, Ridenhour said.

It is too early to tell if the revisions have achieved their goal of reducing manufacturing cycle time, inventory and costs, Ridenhour said. "But one thing's for sure — we're not going to automate unless there's a good business-driven reason to do so," he vowed.

Only the beginning

Martin Marietta Corp., which earned 75% of its revenue from defense last year, has already suffered a "slight" internal IS budget cut and a 10% management and administrative IS work-force reduction, according to Tom Shafer, vice-president for internal information systems.

"We're definitely seeing a slowdown in [expenditures for] hardware across the board," Shafer said, adding that the group is doing less maintenance and enhancements to old applications and shifting those resources to new development. "Enhancements are only being done if they are really needed," he said.

To better cope with future slowdowns, the group's networking department is trying to strike better and more flexible contract terms with vendors. It is also implementing a flexible wide-area network architecture that can be expanded or contracted as demand dictates.

One group that lost the fight was Raytheon Co.'s Missile Systems Division plant in Oxnard, Calif., which was shuttered last month. Only three of 10 systems staff found other work at the company.

The plant's troubles began during the second quarter of last year. "I let three people go, and we didn't buy the terminals we had planned," said Dave Rawnsley, former manager of information processing systems at the plant.

The ax fell on May 15, and Rawnsley was transferred to Raytheon's Electromagnetic Systems Division in Goleta, Calif., where he manages user information services.

Not all contractors are suffering from the slowdown. Firms with solid or growing commercial business claimed to have stable or expanding IS staff levels. At Rockwell International Corp., new commercial business has replaced lost revenue from the B-1 bomber, according to a company spokesman, who said the corporatewide IS organization is actually growing to meet heightened demand. Rockwell earns 25% of its revenue from defense.

McDonnell Douglas' Ridenhour

Though it has yet to feel any impact from defense cutbacks, United Technologies' Stratford, Conn.-based Sikorsky Aircraft division is drawing its IS battle plan, just in case.

Sikorsky, which currently derives 60% of its helicopter business from U.S. defense contracts, is considering expanding its commercial side. Consequently, "the kind of applications we're developing will fit in both [defense and commercial] environments," said Jim Lamoin, director of IS.

Other defense contractors hope to offset declines in military revenue with increases in commercial contracts. Solner cautions that this strategy could backfire, however. "They're not used to competing at the level most of these long-time commercial contractors are," he said. Defense firms are accustomed to five-year contracts and cost overruns, not cost-cutting and day-to-day competition, he said.

However, IS may smooth what could be an otherwise grating transition, Solner said. "Systems can help by providing a common database for the company, something they probably don't have now," Solner said. He added that IS will have to do a better job with trend and statistical analyses to sharpen the competitive edge.

Voiceless outsiders

Ongoing battles between Unisys Corp. and workers who have been laid off, in part, because of defense-contract cuts are baring issues much deeper than corporate or individual survival. Specifically, who should be included in planning and development of new products to replace outmoded or discontinued lines?

Approximately 5,000 Unisys employees in Minnesota have been sent home since the merger of Sperry Corp. and Burroughs Corp. four years ago. About 60% of those left unemployed were victims of consolidation resulting from the merger, according to Unisys. Many of the rest, however, have been cut because the Department of Defense is scaling back procurement.

Laid off Jan. 12, 18-year veteran Claudette Munson was a production assembler on one of Unisys' defense products lines. She now works with a collection of union officials, consultants and a state legislator in an effort to revive idled plants. Other workers have picketed the company for a change in policy.

For the past 18 months, Munson has volunteered with the International Brotherhood of Electrical Workers' economic conversion committee. The committee is developing four proposals for commercial products that could be produced with existing facilities and rehired employees, she said. These products would be transportation control and management systems, advanced aids for the physically disabled, intelligent irrigation systems and low-power electronic lighting ballasts.

Munson, committee consultant Jaimie Markham, state Rep. Karen Clark and others organized to sway Unysis policy have criticized the company for ignoring conversion of assembly lines. Unisys officials, who said they have ignored no suggestions from any quarters, flatly rejected the notion that outsiders should have a voice in how their business is run.

Spokesman Tom Lindquist said the company continues "to apply our existing technologies to new opportunities — in defense or nondefense projects." However, that process will remain internal, Lindquist said.

"When we sit down and talk with people outside the company about sensitive or proprietary information, there is a risk of exposing our plans and of jeopardizing our position in the new market we are entering," he added.

Rep. Clark disagreed. As chairwoman of the Minnesota Economic Conversion Task Force, she has pushed for closer ties among managers/owners, labor and the community. Clark has also endorsed Unysis workers' four-product proposal.

"We're looking for a social contract: [State businesses will] help you, but you have to stick with us, not just pull up stakes and run" if a market sours, she explained.

JIM NASH

High-tech weathering storm

BY J. A. SAVAGE
and JIM NASH
CW STAFF

Defense contractors are keenly aware that they are in for sharp paring this year when the Department of Defense budget ax falls. Yet it is becoming clear to many that the high-technology segment of defense — displays, computers, processors, etc. — will survive with hardly a scratch. In fact, budget cuts may, in some cases, lead to higher sales for computer makers.

Satellite and information filtering technology, essential in war, are equally indispensable in peacetime. Arms-control surveillance and weapons component regeneration will keep many computer companies flush with federal dollars. A similar, though shorter-term, boon will come to companies that help contractors reduce production flab through automation.

"If you are the kind of business that depends on major platforms — i.e., those that roll or fly, [the financial outlook is] bad news," said Jack Moore, a director at Pittiglio Rabin Todd & McGrath, an operations management consulting firm in Mountain View, Calif. However, Moore said, firms making electronic components used in air, land and sea vehicles, such as those used in communications and trajectory computing, can expect continued contract work. "If you can't have a brand-new F-16, at least you can update the electronics," Moore said.

Casualties of peace

Contractors are refocusing and trimming their software development activities to cope with shrinking defense appropriations

McDonnell Douglas	• Re-evaluating automated processes • Cutting IS spending • Trimmed IS staff by 10%
General Dynamics	• Still formulating business plan for data system division • Too early to tell impact of cuts
Raytheon	• Closed missile plant • Laid off and reassigned IS staff
Martin Marietta	• Slight IS budget cut with more to come • Designing flexible networks and negotiating for better vendor deals
Sikorsky Aircraft	• Designing applications to support more commercial business
Rockwell International	• Reduced defense business to 25% of revenue • Corporatewide IS department is growing because of increased commercial business

CW Chart: Paul Mock

The Electronics Industries Association (EIA) is facing defense cuts with a relatively upbeat outlook.

"We're looking at a reduction in defense electronics, including computers, chips and wires, of 2%; that's relatively fortunate compared with what the rest of the cuts will be," said an EIA spokesman. The association estimated that government defense outlays will total $1.1 trillion over the next 10 years, about $450 billion of which will be in electronics. It had no projections for how much of that total would be in computers.

Makers of exotic, expensive computer components have the most to fear. Investing millions in fragile, seemingly single-purpose devices may be fine for military contracts, but commercial markets demand inexpensive, durable and flexible products.

An example today of what may become more common in the future is the tack taken by Palo Alto, Calif.-based Varian Associates, Inc., which announced last month that it will sell off its gallium arsenide chip facility. Gallium arsenide can be used to make fast semiconductors, but it is also expensive and fragile. A company spokesman said, "It's always been out there on the fringe, with its primary utilization in the military. Commercial use was hard to come by."

On the other hand, there are winners such as Silicon Graphics Corp. in Mountain View, Calif. James Clark, chairman of Silicon Graphics, said he sees reason for optimism in cutbacks. Even though $80 million, or 30% of its receipts, come from the government, the company expects a dividend from pared defense budgets, he said.

"We believe our [military] business might actually pick up because of visual simulations, replacing air and ground maneuvers," Clark said.

Caution: Danger ahead

While the prognosis does not look too bad for the computer industry as a whole, "it's a bad move for high-tech companies to make the assessment that they won't be impacted," said Charles DiLisio, senior manager of mergers and acquisitions at KPMG Peat Marwick in San Jose, Calif. DiLisio's list of contractors to first feel a negative impact includes Varian; Gazelle Microcircuits, Inc., a San Jose, Calif., firm specializing in exotic semiconductors; Ford Aerospace Corp., a systems integrator and software developer; and Watkins Johnson Co., a maker of microwave communications.

While existing technology could be leveraged in a peace economy, Moore said he is quite pessimistic about the ability to commercialize military products. "If you're not already a world-class practitioner of just-in-time or other modern manufacturing practices, your commercial counterparts have a 10- to 15-year lead on you," he said.

However, even more fundamental obstacles will trip some converts. Moore pointed out that "competitiveness is a new notion in the defense industry." Lenny Siegel, director of high-tech industry watchdog group Pacific Studies Center in Mountain View, Calif., agreed. "I call it re-acculturation — making the shift from military production values to corporate culture values of profit, deadlines, free thinking. It's a matter of converting the people," Siegel said.

Lloyd J. Dumas, a professor of economics and political economy at the University of Texas in Dallas, and other analysts recommended that even firms with virtually guaranteed military contracts take a meaningful look at alternatives to the contracts.

An alternative to internal restructuring is focusing on defense contractors that need greater automation to make operations leaner in a competitive environment.

Before, firms such as General Dynamics Corp. and Boeing Co. would get a military contract and buy technology "for its own sake," said Malcom Spence, an aerospace industry marketing executive for Digital Equipment Corp. Now, Spence said, they are eager to spend money on more long-lasting technology. Jaimie Markham, principal at Markham and Associates, a consulting firm in Minneapolis, applauded such moves. However, he said, both big and small companies must go beyond planning.

"They need to realize that it's not the end of the world; it's not the invasion of radicals from outer space," Markham explained. "They have to look at the market and say, 'Gee, we need to change.' "

Hup, two, three

One worry dogging computer makers is that federally funded basic research will either be redirected toward military-only use or cut altogether.

In the past, the Defense Advanced Research Projects Agency (DARPA) and its parent, the Department of Defense, have given both money and direction to high-tech research that has straddled the wall between civilian and government use.

"When push comes to shove, the R&D budget will get squashed," said Charles DiLisio, senior manager of mergers and acquisitions at KPMG Peat Marwick in San Jose, Calif. That prospect bothers him, he said, because DARPA has been "the U.S. version" of the Ministry of International Trade and Industry, a Japanese government group that promotes high tech.

In funding academic and industry research, DARPA projects have spawned some surprising successes. Mips Computer Systems, Inc., Silicon Graphics, Inc. and Sun Microsystems, Inc., as well as Unix, real-time software and computer networking, all sprang up with the help of DARPA research.

Lloyd J. Dumas, a professor of economics and political economy at the University of Texas in Dallas, said many computer companies have taken the government's role in high-tech development for granted. What's more, Dumas said, many of those who see potential problems in Uncle Sam's shift have kidded themselves into thinking conversion to civilian projects is merely a "fancy to simple" move.

J. A. SAVAGE and JIM NASH

Off and running

IBM and Sun Microsystems, Inc. are two computer companies that aren't wasting much time in preparing for the post-Cold War government market. In April, IBM combined its Systems Integration and Federal Marketing divisions to form the Federal Sector Division. The consolidation "will allow for a new focus and better planning," said Millie Dunn of the new division. Defense cuts have yet to impact the company, which last year racked up government sales of $2 billion, Dunn said.

Sun is diverse enough to weather defense-related downturns. Its federal division, which services military and civilian contracts from the U.S. and international governments, accounts for only about 12% of the company's corporate revenue.

Hardware rating service sets sights on DEC niche

BY MARYFRAN JOHNSON
CW STAFF

NEEDHAM, Mass. — Carving out a niche as an independent hardware rating service for Digital Equipment Corp. machines and peripherals, a start-up company called Reliability Ratings will deliver its first quarterly report to some 350 subscribers next week.

For the $199 yearly fee, the subscribers will receive an eight-page product-rating report initially focused on the VAX 8000 line and high-end disk drives from DEC and three competitors.

Future reports will rate CPU performance for the Microvax 3000 series and the VAX 8000, 6000 and 9000 lines, as well as disk, tape, memory and printer peripherals from third-party vendors. Greg Strakosch, a former EMC Corp. salesman, started Reliability Ratings in January with funding from five private investors.

"This is a niche that hasn't been filled in the DEC world," said Ira McLain, director of information services for National Semiconductor Co.'s manufacturing installation in Portland, Maine. "You can leverage this kind of information to get better pricing, or for someone with no experience, you can use it to pick the most reliable equipment."

Reliability Research in Salisbury, Vt., has long provided independent ratings of IBM hardware and peripherals, drawn from some 1,400 large IBM sites and sites running IBM-compatible systems, through a software-based automatic reporting system.

The key differences in Reliability Ratings' service are its inclusion of repair times and average uptimes and its less sophisticated data-gathering method at far fewer sites.

REPORTERS' NOTEBOOK

Doings at PC Expo

Hey, did we say we were different? Apple Computer, Inc., a first-timer at PC Expo, spent most of its efforts selling the merits of its connectivity with IBM and Digital Equipment Corp. — not on the features that once distinguished it from the personal computer market. In fact, Apple handed out T-shirts that featured a Macintosh talking protocols to a host.

■

Enough is enough. Microsoft Corp. was conspicuously absent from the show, which featured OS/2 and Windows pavilions, the former sponsored by IBM and the latter by the Windows & Presentation Manager Association. According to a spokeswoman, Microsoft has already spent a tremendous amount of time and money — at least $10 million — on its Windows unveiling and subsequent road show and did not see the need for a booth at either Comdex/Spring '90 or PC Expo. It did demonstrate several products in the two pavillions.

■

Only the vendors know for sure. According to one industry gadfly, many of the packages being demonstrated at the OS/2 pavilion are not yet shipping. For example, Wordperfect Corp. was demonstrating a "pre-alpha" version of the OS/2 Presentation Manager version of Wordperfect 5.1 running on top of an unreleased version of IBM's 2M-byte 16-bit OS/2.

■

Do I have to repeat myself? At least half the press kits at PC Expo were datelined "June 3, Atlanta," which could mean either that exhibitors are embracing recycling en masse or that there is some concern that Comdex failed to convey their message. The latter may be the case, because there was a noticeable increase in reseller attendance at Expo, which is normally a user show.

■

A not-so-dirty not-so secret. One of the more heavily trafficked booths at PC Expo was selling a different kind of software — wet and squishy, to be exact. Yup, they flocked to see Glass Mates, the glass cleaning wipes for the "next generation in cleaning." Well, we all have dirty screens, and marketing is everything.

■

While Micrografx, Inc. wrestled with union electricians in a bid to get its press conference under way, Compaq Computer Corp. experienced a brown-out at the Museum of Holography. A blown fuse dimmed the lights on disappointed attendees, who were shut out of about half of the nifty exhibits in the sparsely outfitted museum. But one Compaq spokesman sprang to the rescue by holding up holograms to the light, and most attendees were mollified with the holographic tie tacks and pins that were handed out.

■

Take a rest, guys. Documentation held up release of Wordperfect Office 3.0 at Comdex, but Wordperfect more than made up for it at PC Expo. Not only did Wordperfect ship Office 3.0, but it also said it will release Wordperfect Rhymer: A Phonetic Word Finder sometime next month. The terminate-and-stay-resident program reportedly will review more than 90,000 words in search of a specified rhyme or phonetic pattern. Also shipping next month are Letterperfect 1.0, a basic word processor, and Planperfect 5.1, which features mouse support, improved printing capabilities and Wordperfect 5.1 compatibility. Slated for release this summer is the Wordperfect Connections Easylink Gateway, a public electronic mail gateway co-developed with Western Union Corp. for Wordperfect Office users.

■

It's coming — really. If you've been holding your breath waiting for the Microsoft/Digital Communications Associates, Inc. server alternative to IBM's OS/2 Extended Edition Communications Manager, it was demonstrated at PC Expo. The Select Server will ship later this summer.

■

Yes, but what about the products? At times, there seemed to be only three topics of conversation at the show: Both the number and caliber of attendees was judged by many exhibitors to be much better than at Comdex/Spring; it seems almost everyone had difficulty flying into New York; and last, but not least, the ticker-tape parade for South African activist Nelson Mandela.

PATRICIA KEEFE and RICHARD PASTORE

DEC adds its voice to 10Base-T chorus

BY JOANIE M. WEXLER
CW STAFF

NEW YORK — The waning interest in coaxial cable as a corporate wiring scheme is likely to become even more anemic with last week's announcement that another high-clout computer vendor — Digital Equipment Corp. — is offering products that support the emerging 10Base-T standard for running Ethernet local-area networks over unshielded twisted-pair wiring.

At the PC Expo show, DEC, a major Ethernet player, unveiled a $2,200 multiport repeater, a $150 transceiver for connecting Ethernet devices to the repeater and a $395 personal computer controller board for 10Base-T LANs.

In addition, the company announced a standard wiring platform — akin to IBM's Cabling System and AT&T's Systimax Premises Distribution System — that provides connectivity for 10Base-T and coaxial-based Ethernet LANs, token-rings, Integrated Services Digital Network and IBM 3270 terminals.

10Base-T provides a cost-effective alternative to coaxial cable, the medium specified in the existing IEEE 802.3 standard for 10M bit/sec. Ethernet LANs. Unshielded twisted-pair (telephone) wiring is already installed in many buildings, is less expensive than coaxial cable and can be used for voice or data traffic, while coaxial cable is limited to data applications.

AT&T has been supporting Ethernet over unshielded twisted-pair for about two years. Other vendors, including Synoptics Communications, Inc., Racal-Interlan, Western Digital Corp., Cabletron Systems, Inc. and David Systems, have been offering 10Base-T-compliant products for several months, and Digital Communications Associates, Inc. announced at PC Expo that it has expanded its 10Net LAN products to include support for the emerging standard.

Existing DEC customers expressed solid interest in running Ethernet LANs over twisted-pair, as well as loyalty to their computer vendor. Scott Digennaro, project manager at the University of Maryland Hospital, said he would check with DEC first for his 10Base-T products, because "as a DEC VAX user, it would be nice to keep all our eggs in one basket."

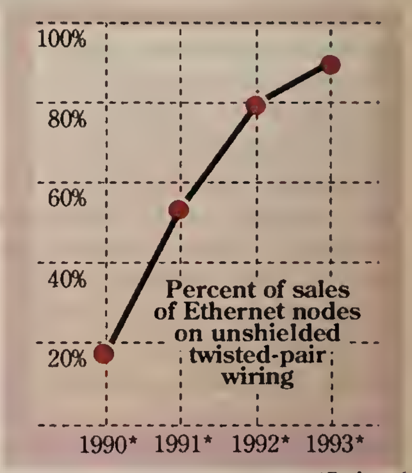
Robert Meihofer, a data systems operations director at Grumman Corp., said that while he will not be expanding his Ethernet LANs for about a year, "we have quite a bit of unshielded twisted-pair already installed, so we'd be a candidate for DEC's products. We also see an advantage in dealing with as few vendors as possible to reduce integration headaches."

DEC said that it is also targeting "non-Digital accounts that already have a twisted-pair cabling plant."

However, Thomas Nolle, president of CIMI Corp., a market research firm in Voorhees, N.J., suggested that DEC "is trying to keep other vendors from extending their reach into the DEC customer base. Until now, those users who wanted to run Ethernet over unshielded twisted-pair have been going to AT&T."

Twist and shout

By virtue of the emerging 10Base-T standard, unshielded twisted-pair wiring will come to dominate Ethernet shipments during the next three years



*Projected

Source: CIMI Corp. CW Chart: Paul Mock

Media mix 'n' match

Proposals for running 100M bit/sec. data traffic over twisted-pair wiring won nods of approval from the American National Standards Institute (ANSI) Fiber Distributed Data Interface (FDDI) committee, which met last week in tornado-torn Wichita, Kan.

In response to technologies presented by Synoptics Communications, Inc. and Chipcom Corp. [CW, June 18], the group scheduled two ad hoc meetings on Aug. 1 and 2 to explore ways to bring the jacked-up speeds of FDDI to user desktops more economically, committee Vice-Chairman Floyd Ross said.

One working group will define requirements and formulate a standards proposal for allowing FDDI's 100M bit/sec. speeds to run over twisted-pair wiring in addition to fiber, the medium currently specified in the ANSI standard for FDDI token-ring local-area networks. The other group will examine the merits of using lower cost fiber media such as plastic for FDDI LANs, Ross said, adding, "We are on the verge of a multimedia revolution, and FDDI is the obvious transport mechanism for that."

The question of whether the standards committee activity can lead to lower cost solutions before the price of fiber products would naturally fall remains. "It's a crapshoot which will happen first," Ross said.

JOANIE M. WEXLER

Applause greets Appletalk licensing scheme

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. moved aggressively to open up its proprietary networking architecture last week when it announced that it will begin licensing its Appletalk software package.

The program will allow manufacturers to obtain the seminal source code and object code of Appletalk — a set of local-area networking protocols used for connecting Apple machines to other computers — directly from Apple instead of trying to duplicate it themselves from scratch.

Apple has recently begun an energetic campaign to expand its range of connectivity options. Early last month, Apple ported Appletalk to the Digital Equipment Corp. VAX world, enabling software developers to write applications that allow Apple Macintosh users to access file and print services on the VAX. A similar port exists for MS-DOS environments.

Reaction to Apple's licensing scheme was swift and positive from developers. Novell, Inc. spokesman Darrell Miller said the program will become "a key part" of his Provo, Utah-based company's desktop strategy.

Appletalk licenses are available immediately for a one-time fee of $40,000, plus an annual maintenance fee of $500. The one-time fee will be reduced 50% if the licensee agrees to offer Appletalk as standard equipment in its end-user products, an Apple spokesman said.

OS/2 Lite: Less filling, but will it be released?

BY PATRICIA KEEFE
CW STAFF

NEW YORK — A newly svelte OS/2 appears to be on the verge of undermining last fall's pledges of unity on OS/2 development from IBM and Microsoft Corp. Although the two vendors are jointly developing a 2M-byte version of a 16-bit OS/2, conversations last week with officials from both firms revealed sharply differing views on whether it should be released. IBM seems to be saying yes, while Microsoft appears to be giving it a thumbs-down.

IBM executives said they "intend" to release a more compact and speedier version of a 16-bit OS/2 at some point, once they correct some printing problems with new, and in some cases, consolidated, device drivers.

"We have large clients in banking, for example, that are willing to spend money on a high-powered server, but they want to connect to low-cost terminals like the Personal System/2 Model 55SX," said David Kerr, a former Hursley, UK, technician now at IBM's Boca Raton, Fla., OS/2 technical planning group. "Sixteen-bit OS/2 still has a lot of life left in it," he added.

At PC Expo last week, IBM demonstrated several advanced technologies still under development, including a sleek OS/2 and an Intel Corp. 33-MHz I486-based "super" server.

Microsoft, however, downplayed the need for a 2M-byte OS/2, adding that the current OS/2 Version 1.2 will run in 2M bytes, albeit with performance degradation. "Our customers want us to focus on a 386 version of OS/2, and that's where we think our energies are best directed," said Paul Maritz, Microsoft's vice-president of advanced technology. Microsoft is also worried about overwhelming users with too many OS/2 releases.

However, the difference in performance between OS/2 1.2 and the as-yet unreleased OS/2 "Lite" was quite evident during an IBM demonstration. Both versions of the operating system were run on two Model 55SXs, each equipped with Microsoft's Excel, a 30M-byte hard drive and 2M bytes of random-access memory. OS/2 Lite was demonstrably faster.

Users of OS/2 Lite reportedly will not have to modify their current OS/2 applications nor learn any new commands. The 2M-byte version was achieved in part by tightening the code and improving the memory management, Kerr said.

Lotus Development Corp.'s 1-2-3/G and a pre-alpha release of the Presentation Manager version of Wordperfect Corp.'s Wordperfect Version 5.1 were also demonstrated running under OS/2 Lite.

Lotus' 1-2-3 product manager Bill Conklin confirmed that performance on the new OS/2 is much improved but also noted that his system was packed with 10M bytes of memory. "That we can take a product [Wordperfect 5.1 for Presentation Manager] that is not completely coded and run it on this operating system is encouraging," said Wordperfect Vice-President of Marketing Andre Petersen.

IBM claimed that it could get the same performance under OS/2 Lite running 1M byte of memory. That kind of functionality and size would for the first time make OS/2 viable on an Intel 80286 platform. "This is definitely a threat to Windows, especially if it runs faster," Petersen predicted. It could also save users committed to OS/2 the bother using Windows as an interim step, said Andrew Seybold, publisher of "The Outlook on Professional Computing."

Some observers speculated that an irritated IBM deliberately scheduled a demonstration of OS/2 Lite as a reaction to Windows 3.0. However, analysts such as Will Fastie, editor of "The Fastie Report," a Baltimore-based business computing newsletter, said he thinks that Microsoft has done too good a job of redirecting the market's attention to Windows. He said Windows will still be cheaper than OS/2 Lite and will have a lot more applications.

Complaint taint

Windows 3.0 may be sailing off retail shelves, but early users are causing backups on Redmond, Wash.-based Microsoft Corp.'s complaint lines.

Compuserve's Microsoft-specific bulletin board was swamped with literally hundreds of complaints about Windows 3.0 last week. Although callers to the company's Windows 3.0 support line were told to expect a wait of half an hour before reaching a technician, Microsoft officials insisted there have been no recurring problems with Windows 3.0.

Most of the problems cited on Compuserve were with specific personal computer clone and network hardware configurations. Incompatibilities with device drivers for certain non-Windows 3.0 software packages, various IBM Video Graphics Array cards and a slew of flavors of PC BIOS accounted for the majority of problems.

"A small percentage of problems with a huge number of shipments is still a large number," said Richard Farmer, director of systems and marketing at Microsoft's customer support division. However, he added, "we have seen no concentrated problems."

Last week, Microsoft did issue a fix for a problem with a disk manager from On Track, Inc. that did not work properly in Windows 3.0's protected mode. The problem had caused the corruption of some data. The two companies developed a fix that was issued over Compuserve.

CHARLES VON SIMSON

HP's merged workstations ease Apollo user fears

BY J. A. SAVAGE
CW STAFF

The first fruits of Hewlett-Packard Co.'s merger with Apollo Computer, Inc. appear to be not only a merged workstation product, but also a reason for established Apollo users to stick with the merged company.

While users were initially pleased with the hardware platforms announced last week, they said that they are looking forward to a merged operating system with trepidation.

The workstations, which are based on Motorola, Inc.'s 68030 processor and will be upgradable to a 68040 by the end of the year, are not a technical breakthrough, users and analysts said. "But it's significant for the base of Apollo users. It tells them that HP won't drop them like a hot rock," said Jim Hammons, manager of technical advisory services at The Sierra Group, Inc., a Tempe, Ariz., market research firm.

Origin of the species

Hewlett-Packard hopes that aggressive pricing of the merged HP/Apollo 9000 Series 400 line will show customers the merits of the Apollo acquisition

Model	MIPS	Processor	Price
400DL	12	50-MHz 68030	$4,990
400T	12	50-MHz 68030	$6,990 to $14,990
425T	20	25-MHz 68040	$8,990 to $16,990
400S	12	50-MHz 68030	$13,990 to $53,990
433S	26	33-MHz 68040	$15,990 to $55,990

CW Chart: Paul Mock

"They're putting their money behind their claims that they won't leave either HP or Apollo users in the dust," echoed Doug Eltoft, director of operations at the Iowa Computer-Aided Engineering Network. Eltoft noted that even the name of the new series, the HP Apollo 9000 Series 400, retains the Apollo identity. "That alone has worth," he said.

Clearing hurdles

Since HP acquired Apollo in April 1989, many Apollo customers like Eltoft have complained of the ensuing bureaucratic obstacles to support and information. Some, such as David Krowitz, system manager of the Earth, Atmospheric and Planetary Science Department at MIT, are considering, or have invested in, Sun Microsystems, Inc.'s products. Sun is HP's prime competitor.

While the merged hardware, which can support either Apollo's or HP's version of Unix, is a sign to Apollo users that they will not be forgotten, the specter of a combined operating system causes more hesitation.

"We'll see what they come out with for an operating system, but I could dump in more [Sun workstations] today and maintain total compatibility," said Jim Budler, operations manager at Silvar-Lisco, Inc., a Sunnyvale, Calif., software development firm.

"It looks like we'll have to do a total recompile in the next change," Budler said. "How well they do it is a worry. It could be painful."

The first combined operating system, which HP said would be available in "roughly the middle of next year," will actually be three operating systems — Apollo Domain, HP UX and the Open Software Foundation standard — according to Bob Weinberger, manager of product marketing at the Apollo Division.

He said that if users have newer third-party applications, or if they have written applications to industry standards, "at most, they'll have to recompile." If not, those applications will have to be rewritten to standards such as Motif.

Al Tingey, systems manager at Howard Hughes Medical Institute in Salt Lake City, said that he is willing to migrate to the combined operating system but not until it has settled out. Tingey and other users expressed the hope that HP will provide compilers and other tools to make that migration easier.

Hammons said he believes that the next step toward a merged operating system will be a reduced instruction set computing-based merged hardware platform, and that it will be announced before the end of the year.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Copyright 1988 by CW Publishing/Inc. All rights reserved.

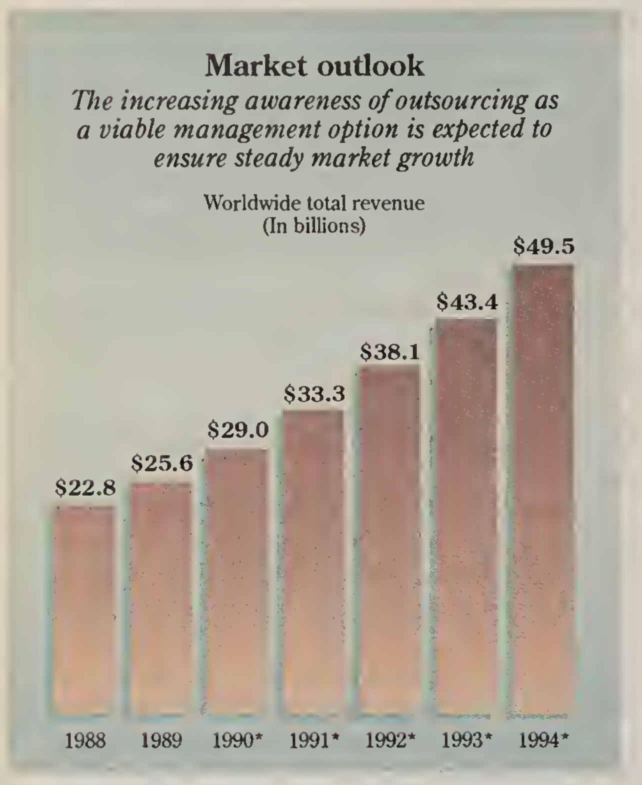
Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: back issues, if available, may be purchased at $2.00 per issue, plus postage. Call (800) 669-1002.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970, 508-744-3350.
Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. For Back issues contact Margaret McIndoe.
Requests for missing issues will be honored only if received within 60 days of issue date.
Subscription rates: $2.00 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So. America — $130 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002.

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, P.O. Box 2044, Marion, OH 43305.

TRENDS

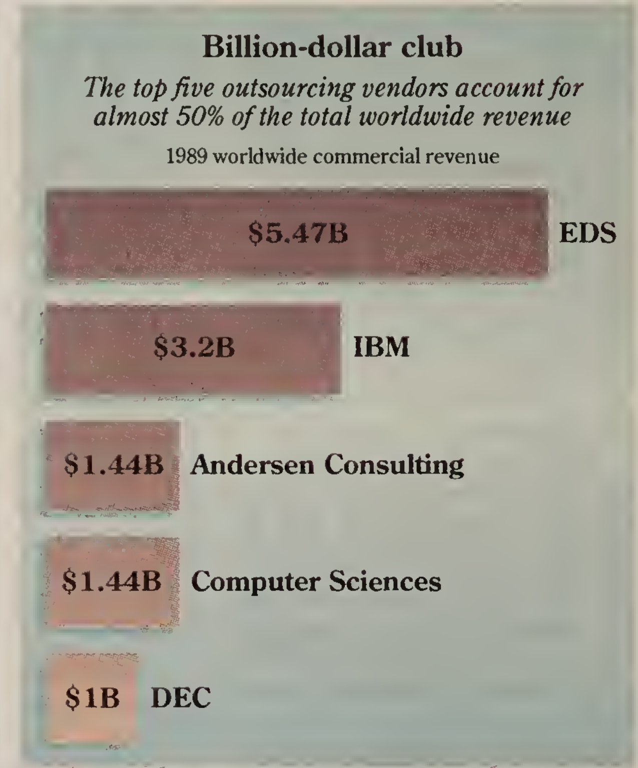
⟨OUTSOURCING⟩

An old concept with a new name, outsourcing appears to be headed for steady growth, especially in the field of systems integration



Market outlook

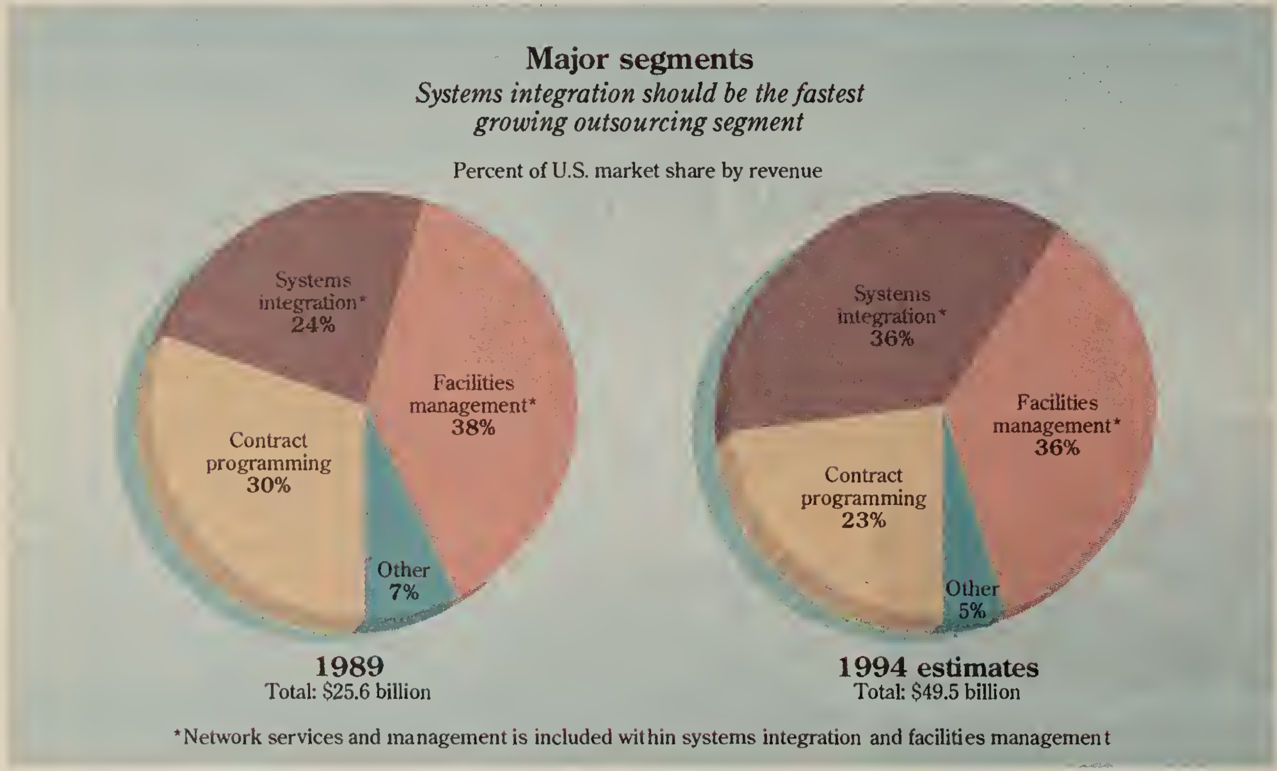
The increasing awareness of outsourcing as a viable management option is expected to ensure steady market growth



Billion-dollar club

The top five outsourcing vendors account for almost 50% of the total worldwide revenue

*Projected



Major segments

Systems integration should be the fastest growing outsourcing segment

*Network services and management is included within systems integration and facilities management

Source: The Yankee Group, Boston, Mass.

CW Chart: Tom Monahan

NEXT WEEK

Up, up and away takes on special meaning at America West Airlines, where the information systems organization, which includes a new for-profit technology services division headed by **Jorge Franco**, has grown as quickly as the booming company has. Go on-site with Franco and America West in the Systems & Software section.

Michael Norton

The continuing health of proprietary pharmaceutical makers depends to a large extent on how effectively they are able to deploy information systems to expedite the development and approval of patented products. Turn to Manager's Journal for a detailed look at what these companies are doing to streamline the route to market.

INSIDE LINES

Trotting out the big guns

In case there's any doubt that Microsoft has plans to bring out another release of DOS, its chief architect of OS/2, Gordon Letwin, has been reassigned to DOS, a developer source claimed. According to one analyst under nondisclosure, Microsoft wants to provide Windows 3.0 users with a much better version of DOS. The source said Microsoft's plan is to take some of OS/2's technology and put it into DOS. Many observers said it's only a matter of time before Microsoft merges DOS and Windows, which will become compatible with OS/2.

Please hold, we're rebooting

Take a Macintosh, add voice and stir briskly. That's what Northern Telecom has been doing for the last year or so, and the resulting concoction will be served to the public next week. According to Northern, the product will do more than just use an incoming call's identification number to access files on an Apple Macintosh workstation; on the other hand, it is not the long-awaited Mac-to-ISDN offering, which both Northern and Apple are rumored to be working on.

Get out the bug bombs

A swarm of summertime bugs are apparently buzzing through IBM's latest version of the Unix-based AIX operating system for its RISC System/6000 line of workstations and servers. Analyst Nili Young at Meta Group, Inc. in Westport, Conn., said certain software developers are stymied by problems with two networking software features needed to connect with the industry-standard Network File System. As a result, many of the multiuser applications for shared environments — expected to ship this fall — will likely be delayed. Another source cited a New Zealand source citing a UK source (just so you know) that claimed IBM is about to recall some or all of its RS/6000 workstations. Why? Because every time you try to run a C++ application on the RS/6000, the system crashes. But that's a software problem.

PCjr II?

It looks like IBM will announce its home version of the Personal System/2 tomorrow. The invitations to the New York press conference went out last week bearing the slogan, "IBM brings it all home." IBM is calling the mystery machine "a product for the whole family." Microsoft's Mike Maples is expected to attend the party. Rumors are that the box will approach an expensive $1,000 and will lack a hard disk.

Up and running in Beverly Hills

A completely revamped version of Apple's popular Hypercard program will be unveiled tomorrow at the Seybold Digital World Conference in Beverly Hills, Calif. The updated Hypercard 2.0 will include at least six major enhancements and 100 new features. It will come bundled with Apple computer purchases or be available separately for $49.

Steal this computer

Hackers who publish tutorials on how to break into computer systems may be within legal bounds but often overlook that this information may be used illegally. "In that respect, publishing critical information about someone else's computer system is like launching a missile and walking away from it, without taking responsibility for where it lands," said William Cook, assistant U.S. attorney and one of the government's top computer crime busters. Cook has been the target of attack by civil libertarians who charge that the government's crackdown on computer crime has been heavy-handed.

The Software Publishers Association has taken its antipiracy campaign to the skies. American Airlines passengers watching the "Minding Your Business" in-flight video will see SPA Executive Director Ken Wasch warning of the SPA's enforcement procedures against users who illegally copy PC software. But dissension may be appearing within the SPA ranks. Borland President Philippe Kahn told the Los Angeles Times, "It's like dealing with drug abuse. Arresting users won't solve the problem." If you have some legitimately procured tips to share with us, call Assistant News Editor Jim Connolly at (800) 343-6474, fax us at (508) 875-8931 or drop a note via MCI Mail (address: COMPUTERWORLD).

©1990 Wang Laboratories, Inc.

GET OUT OF THE TOWER.

Your business battles won't be won by a bunch of guys up in some ivory tower somewhere.

Real help comes only from people who have seen your business the way you see it.

From the frontline, from the trenches. Day in, day out.

That's exactly where you'll find thousands of people from the new Wang—not in the home office, but on the frontlines of business around the world.

For example, we're sending hundreds of application engineering teams into the field to work side-by-side with you.

To learn, first-hand, how you work. To face the problems you face. To see your vision of your business.

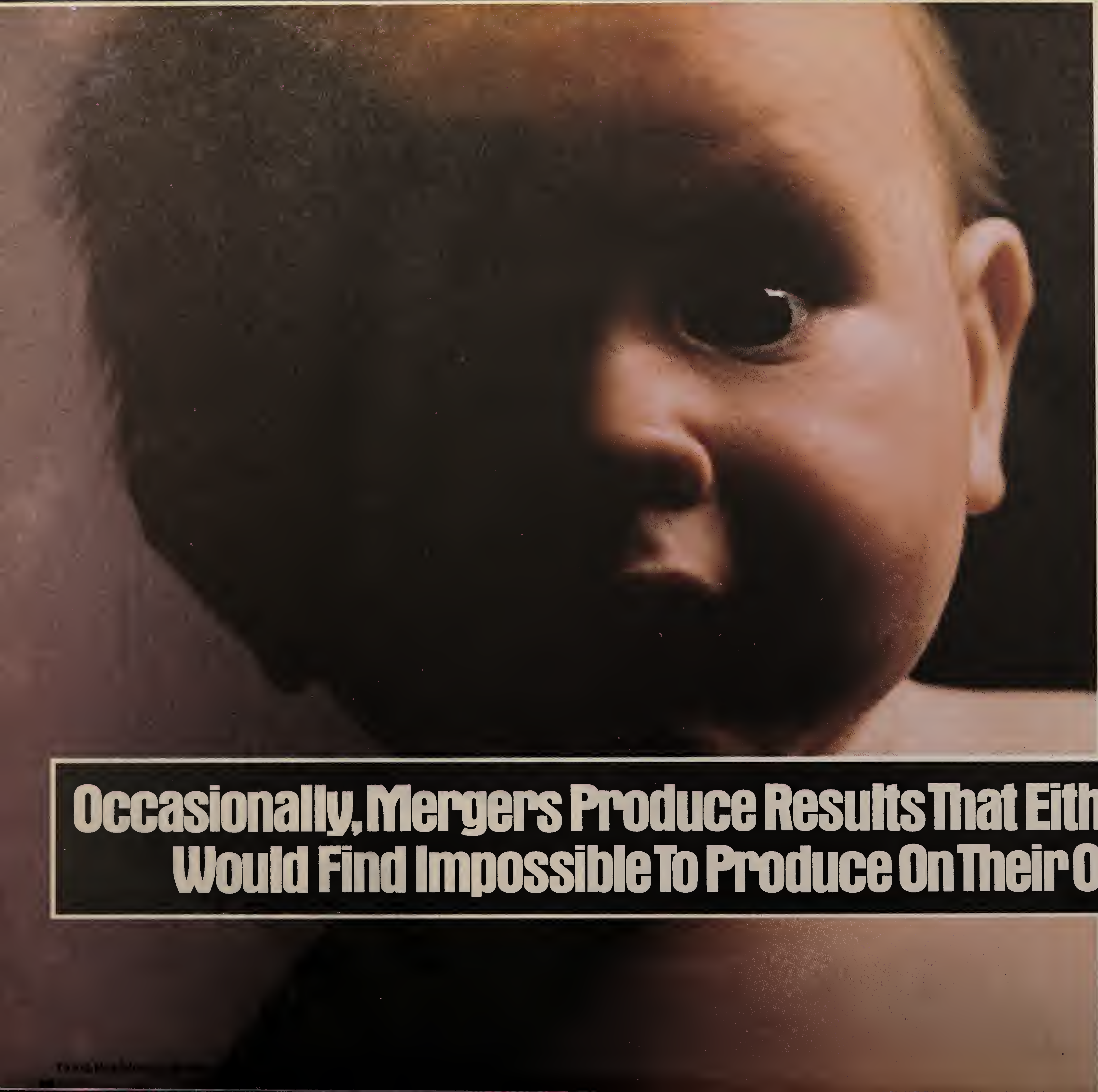
Then to create the solutions you need.

Not ready-made, one-size-fits-all solutions, but custom-made answers to your real-world situations.

Lots of companies talk about building partnerships.

But how many are willing to put their own people right in the trenches with you?

LET'S GET TO WORK. WANG



Occasionally, Mergers Produce Results That Either Party Would Find Impossible To Produce On Their Own.

It's not surprising that two can sometimes accomplish things that one never could. What is surprising, however, is just how beneficial the merger of McCormack & Dodge and Management Science America (MSA) promises to be.

Together they are combining their talents and energies, along with an unprecedented wealth of experience, to form D&B Software.

On March 1, 1990 MSA Software Merged With McCormack & Dodge To Become Dun & Bradstreet Software.

With more than one-third of the staff committed to servicing and enhancing your existing software, D&B Software will thoroughly protect your investment. And the company works with more than 10,000 customers worldwide. That means unmatched proficiency in dealing with problems, and knowing what works and what doesn't. While raising customer satisfaction to new heights.

The merger will have unexpected benefits in other ways as well. The R&D budgets and expertise of the two companies are now combined. So you can be assured that D&B Software is extraordinarily equipped to help you navigate the tremendous technological changes that lie ahead. Doing so by enhancing current products. And by providing clear migration paths to the next generation of software.

MSA
The Software Company

D&B Software will also make certain you aren't left behind in an increasingly global marketplace. Because, with the resources of two companies, your needs can now be attended to in more than 60 countries with a network of seasoned company representatives. And the software solutions themselves are designed to operate worldwide and on multiple hardware platforms.

McCormack & Dodge

D&B Software is the largest applications software and services company in the world. With the biggest capacity for doing whatever the customer requires. And doing business with a stable, reliable company such as D&B Software, with the full backing of The Dun & Bradstreet Corporation, will allow customers to do something they've always wanted to do. To concern themselves less with their software and more with the business at hand. D&B Software. The happy result of a merger. And living proof that when two become one, extraordinary things can happen.

For more information about a most welcome addition to the world of software, call (404) 239-INFO.

D&B SOFTWARE